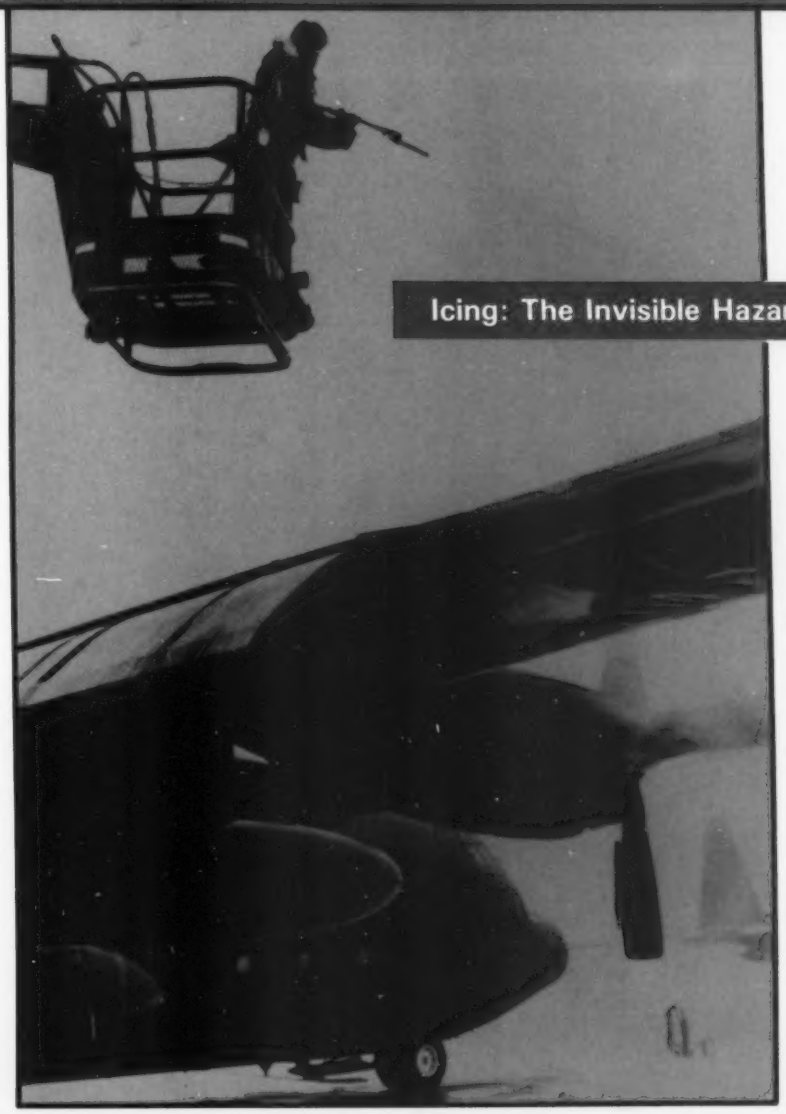
TMF

October 1991

THE MAC FLYER - For Greater Safety in MAC Air Operations



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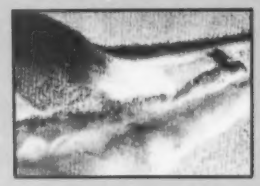

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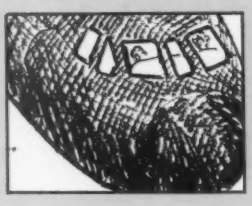

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We Just Disagree

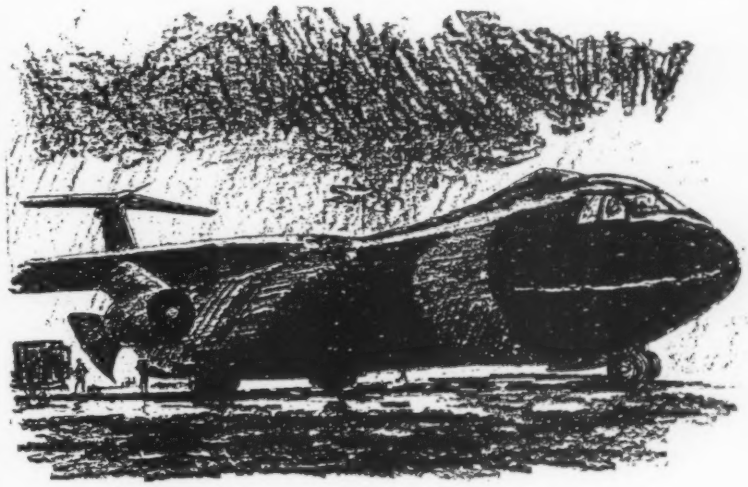
By: Maj. Donald R. Dillman
Colleyville, Texas

Two green and black Lockhead C-141s sit on the rain-covered parking ramp at the Detroit Metropolitan Airport. Mercury vapor lamps illuminate the area, creating grotesque shadows. The first plane is dark and uninhabited. An engine cowling is open and a maintenance stand is near. The second plane diverted into Detroit and is the center of activity. A fuel truck is hooked to it with rubber umbilical cords. Men quickly unload baggage from a truck near the rear of the plane. Rain begins to fall and the men pull their collars higher.

Several buses sit idling nearby. Their exhaust fumes belch a blue mist into the night air. The lights in the buses illuminate the passengers who will shortly get on the plane for their trip home. Some lean back in their seats and sleep. One woman reads a magazine. A small group of men are clumped together in quiet conversation. The driver on the closest bus turns on the windshield wipers. They clear a path through which to watch a lone man as he runs toward the front door of the plane.

SSgt. Steve Jenkins turns around from his flight engineer's table to watch the aircraft commander climb the stairs to the flight deck. The man stands upright to his full six-foot height. He has broad shoulders and a thick stomach. His bald head glistens with a combination of perspiration and rain. He pulls a red bandana from his leg pocket and wipes his forehead. Sergeant Jenkins chuckles; he can't know that in a short time he won't have much to laugh about.

He laughs more and more as he contemplates the pilots. He's forgotten how it was in the beginning. . . . when he was too scared to say anything to the officers. He didn't want to bother them with his little problems. Now he has accumulated an impressive total of 463.2 hours as a flight engineer and has had some time to think about such things. He's come to realize just how important his job is. He also knows how little the pilots do. They show up just prior to engine start and want to know why everything isn't done yet. They do a simple job and then spend the next few hours at cruise, complaining. It bugs him that they actually seem to enjoy their



HONORABLE MENTION
1991 MAC FLIGHT SAFETY WRITING CONTEST

job. It can't be that hard to do if they actually like doing it. They never listen to what he says, so why should he say anything. If they're so smart, they should know what's going on. They remind him of his father.

The aircraft commander picks up a magazine from the navigator's table, flips the pages slowly and attempts to start a conversation with Steve. "That bad weather is just about here. I didn't think that little ol'gal on Channel 4 knew what she was talking about this afternoon, but, sure enough, the sky looks like it's getting ready to fall."

Steve nods quietly and turns to the paperwork on his worktable.

The passengers file through the small entrance door. One smaller man struggles with a brown case and slips on the wet steps. He's visibly nervous. One group approaching the plane had been sitting together on the bus telling stories of past flights. These stories now reflect the masks of concern covering their faces. A tall brunette stops on the top step of the entrance ladder and looks up at the violence of the night sky one last time. She enters the plane and shivers uncontrollably.

The copilot tunes the radio to the latest weather report. The colonel leans over the back of the pilot's seat and turns his head slightly to hear the speaker.

"Detroit Departure information Papa, 2355 Zulu observation, sky 200 overcast, one-half mile visibility in fog and rain, temperature 50 degrees, dew point 48 degrees, winds 230 at 10 knots. On initial contact. . . ."

"Steve, couldn't you arrange any better weather than this for our little ol'trip to Arizona?" The pilot looks around and smiles as he tries to get through the armor which the young staff sergeant is wearing.

"Sorry, sir. But it's the best I could do on such short notice."

"Well, don't worry. It's nothing this old war horse can't handle."

"Colonel, exactly which old war horse are you talking about? This big green metal one we're sitting in or you?" Self-satisfaction brings a smile to the engineer's face. Trying to ignore the thinly veiled sarcasm, the colonel stumbles slightly as he moves around the pilot's seat and sits down roughly on the thin orange cushion. His eyes meet the copilot's questioning glance and they both shrug.

Why the hell did I say that, wonders Steve, knowing the man didn't deserve it? Maybe I'll try to make it up to him later. I'll tell a couple of jokes and he'll forget about it.

The plane rocks slightly in the wind. Steve looks around the cockpit. It's dry despite the storm outside. A newspaper lays unread in one of the seats. Books are opened on the worktables. Light green paint covers the overhead panels. The familiarity of it all comforts Steve. Graffiti is scratched on one of the empty panels on the navigator's station. The overhead lights create a feeling of warmth and security. Steve stretches to look out the side window at the storm. The sky is a potion of destruction mixed with lightning in the huge pot of night sky. The fear all aviators carry in their bellies struggles to get Steve's attention.

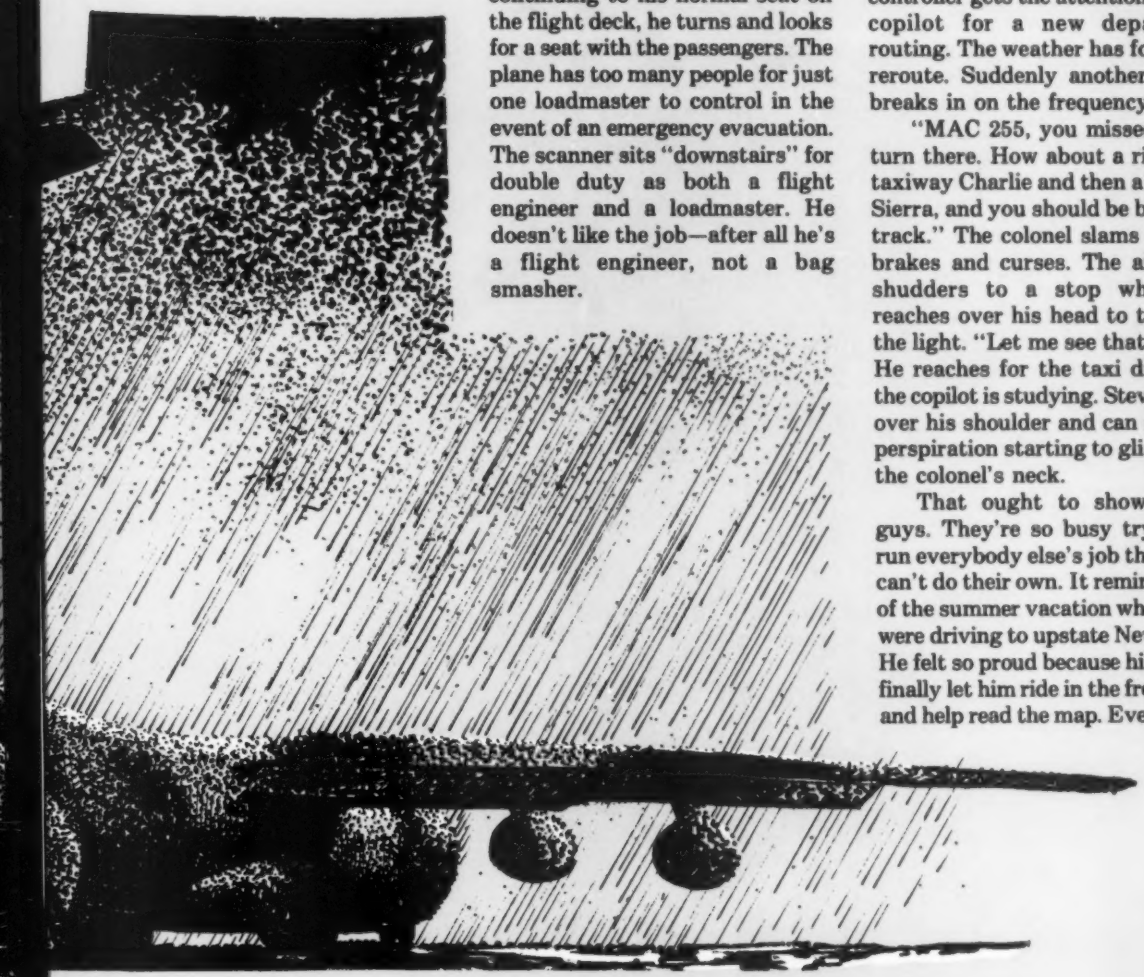
The other flight engineer checks in on interphone. "Scanner's on. Final walkaround's complete." He breaks from the texbook script. "It's really starting to come down out here guys; how about some speed so I can get out of the rain."

The colonel looks out the rain-streaked windscreen at the young enlisted man and nods. He is standing with his back to the wind, huddling, trying in vain to stay dry.

"Let's get this thing started up and be on our way."

Steve sits back in his seat, closes his eyes and takes a deep breath. He knows what's coming next. The old hurry up and let's see how fast we can get everything done just because the old man wants to. Well, I'm not so sure it's going to happen that fast tonight, Colonel. I know you're the pilot, but my job is just as important as yours and you're going to have to wait for once. Who does he think he is anyway? He's not the one standing outside in the rain. He thinks he's being such a great guy to us little people.

The crew gets the transport started and the drenched scanner gets back inside the warm, aluminum cocoon. Instead of continuing to his normal seat on the flight deck, he turns and looks for a seat with the passengers. The plane has too many people for just one loadmaster to control in the event of an emergency evacuation. The scanner sits "downstairs" for double duty as both a flight engineer and a loadmaster. He doesn't like the job—after all he's a flight engineer, not a bag smasher.



As the copilot radios the control tower for taxi instructions, a huge bolt of lightning strikes in the distance. It threads its way across the sky, illuminating the airport before the darkness returns. Rain puddles behind the C-141 scatter as the engines push the jet forward. The pilot taxis slowly from the parking ramp and down the unfamiliar taxiways. Steve tunes out the constant flow of talking on the radio. The frequency is filled. Arriving airplanes are holding around the airport awaiting gates. The scene is one of controlled confusion. On the second attempt, the ground controller gets the attention of the copilot for a new departure routing. The weather has forced a reroute. Suddenly another voice breaks in on the frequency.

"MAC 255, you missed your turn there. How about a right at taxiway Charlie and then a left on Sierra, and you should be back on track." The colonel slams on the brakes and curses. The airplane shudders to a stop while he reaches over his head to turn up the light. "Let me see that map." He reaches for the taxi diagram the copilot is studying. Steve looks over his shoulder and can see the perspiration starting to glisten on the colonel's neck.

That ought to show those guys. They're so busy trying to run everybody else's job that they can't do their own. It reminds him of the summer vacation when they were driving to upstate New York. He felt so proud because his father finally let him ride in the front seat and help read the map. Everything

had gone well until they missed the turn at Syracuse. They passed it by 25 miles and had to turn around. He remembered his father slamming on the brakes, waking everyone else in the car. The memory makes Steve's stomach tighten. He had many such memories of his father.

Steve hadn't thought about a similar incident in years. He was only 9 or 10 when it happened. They'd gone to the lake to fish—just Dad and him. Steve had his hand around the rubber grip of the outboard's throttle, squeezing so hard his knuckle was white. The wind blew his hair. He looked at his dad sitting in the front of the boat and a smile covered his face. The engine coughed then died from lack of fuel. Steve's memory is a blur of his dad's yelling. "How could he let them run out of gas? What a disappointment you are. Why didn't you stay home?" It was never the same between them after that afternoon. They never went to the lake again. From that day on, Steve knew he had to take care of himself and no one else.

"Let's hurry up with the Lineup Checklist Engineer. We're getting near the end of the runway and I don't want to wait to get the checklist done."

They're taxiing again. Steve can't concentrate. So many thoughts race through his mind. He looks at the colonel. He wants to be reminded of his dad so he can focus on his anger, but they are so different. Steve rubs his eyes and reaches for his checklist.

As the Starlifter turns to face the end of the runway, an airliner flashes by. Contrails stream off the wingtips. Spoilers on top of the wing raise and lower quickly in unison, in response to the gusting wind. The plane touches down hard. The thrust reversers open to cover the engine exhausts. The frantic roar of the reversed engines penetrates the Starlifter's cockpit.

"MAC 255, Detroit Tower. Cleared for takeoff. Winds 310 at 25 gust 35. Traffic's a Northwest DC-9 on four-mile final." The colonel pushes up the throttles and releases the parking brake. The landing lights penetrate a small path in front.

Steve reads the last part of the checklist. The pilots are concentrating on the dark runway ahead. Steve looks forward at their panel. Something doesn't look right. The airplane accelerates sluggishly, probably from the wind and the heavy fuel load. Lightning strikes several times in quick succession off the end of the runway. Steve doesn't like it. He's never seen weather this bad. The airspeed indicators show 100 knots. The engine instruments show full power even though the jet's roar doesn't penetrate Steve's thoughts. The runway lights flash by. Why don't these guys stop and wait this one out? Something doesn't feel right, doesn't anybody else feel it? His boot is poised over the foot switch controlling the interphone and allows him to yell his frustration. But I can't say anything. They won't understand. They won't listen to me. His stomach tightens. Things are a blur. Steve can't focus on anything but the daggers of rain exploding on the windshield. Can't these guys see there is something wrong?

Steve thinks of his father for the last time.

"Reject," he yells before he can stop himself. He jumps when he hears his own voice in the headset covering his ears.

The pilot pulls the four throttles into reverse thrust, while pushing on the brake pedals as hard as he can. Steve reaches for the back of the copilot's seat to steady himself. His shoulder straps tear at his chest. The manual in front of him flies to the floor, crashes open and spreads pages everywhere. The newspaper in the jumpseat flies forward. A cup of coffee next to the copilot spills. Red lights on the end of the runway rush toward them. The anti-skid braking shakes the plane as it works to keep the wheels from locking. Steve closes his eyes.

The plane shudders one last time before coming to a stop. The pilot looks around at Steve for an explanation. "What was the reject for?"

A roar comes through the cockpit door from the cargo compartment. Then anticipation and fear of the passengers erupt into spontaneous applause. They know they didn't want to fly.

How am I going to explain that I put us through a dangerous rejected takeoff because of a feeling? Boy, have I done it now. As Steve opens his mouth, hoping something intelligent will come out, the copilot utters a soft curse.

"My God, look what we forgot." His statement summed up the situation and could double for the epitaph on their headstones. The copilot's ashen face contradicts the calmness of his voice. He points to the center console. All eyes in the cockpit turn to the retracted flap handle.

Maj. Dillman (now separated from the ANG) is a 1978 AF Academy graduate who flew C-141s throughout his career. Prior to separation, Major Dillman was a member of 172 MAG, activated during Desert Shield/Desert Storm. He is now an MD-80 captain with American Airlines. Major Dillman points out that, unlike the character in his story, he loves his father.

Flying-Hour Milestones

10,000

166 TAG
Lt. Col. David L. Cook

512 MAW
TSgt. Bernard Feierstein

913 TAG
MSgt. Richard C. Zimmerman

7,500

143 TAS
SMSgt. Stanley R. Wilbur

300 MAS
Col. William Dubis
Lt. Col. Joseph W. Barnes
Lt. Col. Paul A. Ray
MSgt. Thomas L. Barker

326 MAS
Lt. Col. Frederick C. Bok
Lt. Col. Charles O. Sanders
Lt. Col. Charles P. Schafer
MSgt. Harold L. Lamma
MSgt. Albert S. Rice

328 TAS
MSgt. Charles P. Bellomo

335 MAS
Lt. Col. Thomas Hurd
Maj. Samuel Oglesby
MSgt. Joseph Fiordaliso

700 TAS
Lt. Col. David H. Smith
MSgt. Manford W. Kimball
MSgt. Raymond J. Parsons
MSgt. Ruiz Veda

709 MAS
Lt. Col. James W. Schultz, Jr.
MSgt. Jonathan C. Bonnett

756 MAS
MSgt. Paul R. Oliver

911 TAG
Lt. Col. Robert E. Gaughan, Jr.

5,000

73 AAS
Lt. Col. Llewellyn Alspach
Maj. Franklin E. Cox
Maj. Bonita J. Heffner
Maj. Roy W. Partridge
MSgt. Steven L. W. Lindsey

94 TAW
Col. James M. McCormick

143 TAS
Lt. Col. John A. MacLennan

166 TAG
Lt. Col. Ernest G. Talbert

300 MAS
Lt. Col. Wayne R. Courtney
Lt. Col. John C. Totilas
Maj. Rick E. Carter
Maj. Jonathan C. Christie
Maj. Bruce R. Elliott
Maj. James J. Emma
Capt. John M. Bookas
MSgt. H. G. Carner
MSgt. Bobbie G. Sheffield

326 MAS
Lt. Col. Patrick Gallagher
Lt. Col. Robert D. Welsh
Maj. David L. Arnold
Maj. William B. Benton
Maj. Frank R. Freeman, Jr.
Maj. Robert E. Geiser
Maj. Matthew J. Gioia
Maj. Douglas S. Gwyn
Maj. Ronald W. Ransom
MSgt. Charles H. Horner, III.
MSgt. Roger D. Jarvis
MSgt. George L. Payne, Jr.
MSgt. David W. Yarrington

328 TAS
Maj. William R. Pfeil
Maj. Lenhart D. Saner
MSgt. Richard Snyder

335 MAS
Maj. Charles Awbrey
Maj. William Bosma, III.
Maj. John Coller
Maj. Kathleen Cosand
Maj. John Howlett
Maj. John Ingman
Maj. Thomas Lawler
Maj. John McIntyre
Maj. Forman Meachem
Maj. Robert Polk
Maj. James Siemion
Maj. William Smiley
Capt. Robert Riebow
SMSgt. James Logie
MSgt. Chauncey Beasley
MSgt. Henry Fylstra
MSgt. Robert Moser
MSgt. George W. Young, Jr.

337 MAS
Col. Robert McMillan
Lt. Col. Joseph E. Butler
Maj. Bruce Cartwright
Maj. David E. Doyle
Maj. Daniel J. Nichols
MSgt. Paul G. Benson
MSgt. Elton W. Wiehe
TSgt. James J. Deffely

701 MAS
Maj. Donald E. Combee, Jr.
Maj. William J. Travis
CMSgt. Robert S. Brock
MSgt. Darrell L. Wyrick
MSgt. Fleming D. Smith
TSgt. Candace L. Taylor
SSgt. Louis C. Marino

702 MAS
SSgt. Kevin P. Hauschka

709 MAS
Lt. Col. John L. Adams
Maj. Richard W. Johnstone
Maj. Michael A. Kelly
Maj. James E. Kimbleton
MSgt. David E. Burke
MSgt. R. Patrick Wilson
MSgt. Peter A. Stevens
TSgt. Albert E. Lucas

911 TAG
Lt. Col. Paul W. Roth, Jr.
TSgt. Richard H. Dapprich

913 TAG
Lt. Col. Howard M. Clark, Jr.
Maj. James W. Buck
Maj. Dennis Russell, Jr.
Maj. George J. Prokipiak
Maj. Charles E. Ramsey
Maj. Thomas V. Tamez
SMSgt. Francis J. Hirsch, Jr.
MSgt. Clarence C. Walters
TSgt. Terry L. Budge
TSgt. Keith A. Knepp

2,500

17 MAS
Capt. Richard M. Lassiter
MSgt. Joseph K. Wetherington
SSgt. Stephen Sanders

20 MAS
SSgt. Robert M. Shelton, Jr.

34 CATS
Capt. Damon K. Booth
Capt. Carlston D. Everhart
Capt. Job W. Causche
Capt. Brian J. Giles
Capt. Richard J. Giles
Capt. Richard J. Hague
Capt. Michael W. Hurst
Capt. Carroll J. Ingram, Jr.
Capt. Keith A. Kaiser
Capt. David Q. Schlortt
Capt. Stephen M. Strigel
Capt. Allan L. Swartzmiller
Capt. Jan J. Sztuka
TSgt. Mark A. Leonard
SSgt. James E. Wood, III.

41 MAS
SSgt. Robert W. Richards

57 MAS
Capt. Carl W. Agar
Capt. Medardo M. Malic
Capt. Daniel J. Stoher
SSgt. David R. Young

61 TAS
Capt. James D. Caldwell
Capt. Fran Santiago, Jr.
Capt. Darrin J. Simmonds
Capt. Scott D. Stephenson
Capt. Hadj N. Thomas
TSgt. Thomas N. Norris

62 TAS
Maj. Anthony R. Watzke
Capt. Franklin D. Rand

76 MAS
Sgt. Daniel S. Webster

166 TAG
Maj. Charles W. Gross, Jr.
Capt. Gregory D. Carr
Capt. Carol A. Timmons
2d. Lt. Jeffrey McGowan
MSgt. Wayne R. Bernardo
TSgt. Charles L. Harris, Jr.

337 MAS
Capt. Stanley R. Butler
Capt. Keith P. Guillotte
Capt. Ryan O. Rickarby
Capt. Gregory S. Symonds
MSgt. Douglas R. Bare
MSgt. Paul R. Harrison
TSgt. Robert F. Callery
TSgt. Anthony C. Colucci
TSgt. John J. Duffy
TSgt. Daniel G. Hogan
TSgt. Christopher J. Maille
TSgt. Albery F. Trychon

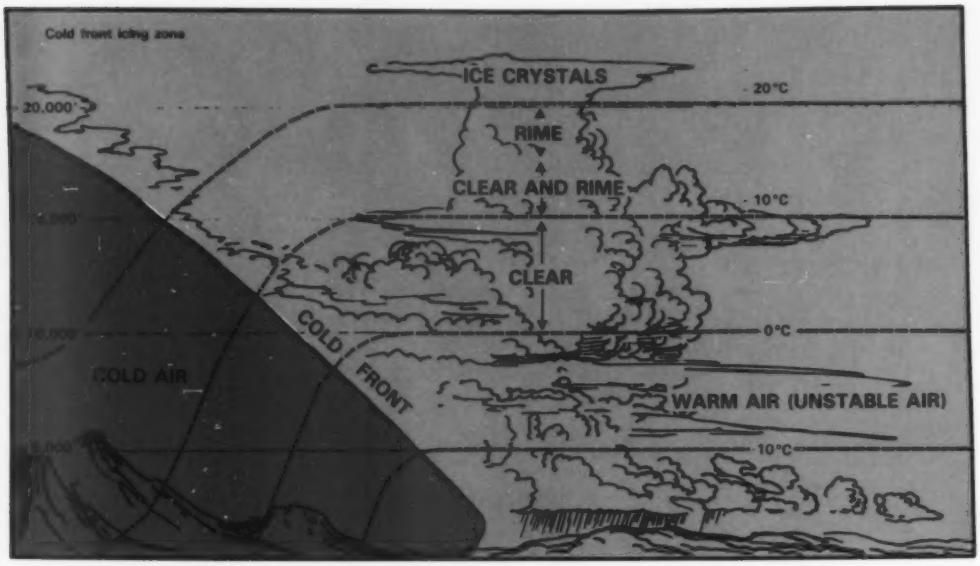
700 TAS
Maj. Kevin J. Gootee
Capt. Robert D. Armour
Capt. Raymond S. Davis
Capt. Kevin J. McNeight
MSgt. Charles W. Lane
MSgt. Francis D. Sims

913 TAG
Maj. Dennis W. Krummel
Maj. Michael P. StGeorge
Maj. James Mancini
Capt. Steve J. Bellefontaine
Capt. Joseph A. Chaippini
Capt. Joseph J. Fusco, Jr.
Capt. Luke J. Kealy
Capt. Brian J. Kraemer
Capt. David L. Maloy
Capt. Jack H. Polo
Capt. Paul R. Ries
TSgt. Terence D. Kelly
TSgt. James M. Overbeck
TSgt. James E. Webster, Jr.
SSgt. Michael L. Addis

Ranks and units are those at time of award.

Icing: the Invisible Hazard

Prepare today for winter weather operations



"Line-up checklist, copilot. The scanner says we've got a thin layer of ice building up on the wings," calls the aircraft commander.

"Roger. Let's get this beast off the ground before we get any more," responds the right-seater.

Was that a good decision? What would you do in this case?

The conversation above reflects the popular misconception that "a little icing can't hurt us." In fact, a little ice can *kill* you! Ice, frost, or snow formations on the leading edge and upper surface of a wing, with a thickness and surface roughness similar to medium or coarse sandpaper are not too much, you say? You're wrong. Wind tunnel and flight tests have shown that such ice can reduce wing lift as much as 30 percent, and increase drag by 40 percent. These changes in lift and drag significantly reduce controllability and alter flight characteristics.

Although icing may occur during any season of the year, in temperate climates like the U.S., it occurs most frequently in the winter. So, with the winter season rapidly approaching, a review of our icing procedures is clearly in order.

Icing

Aircraft icing is divided into two types: structural and induction. While structural icing affects the exterior of the aircraft, induction icing occurs in the power plant itself. There are three basic types of aircraft structural icing: clear, rime, and frost.

Clear ice, the most serious form of structural icing, is a glossy ice identical to the glaze which forms on trees or other objects as freezing rain strikes the earth (or your plane). Clear ice, normally formed at temperatures between 0 and -10 degrees C, is most frequently encountered in cumuliform clouds and freezing precipitation.

Rime ice is formed when small super-cooled water droplets strike the aircraft and instantly freeze. Rime ice, most likely to accumulate in the 0 to -20 degree C temperature range, is a milky, opaque ice with a rough surface.

Frost, as in "the frost on the pumpkin," forms on the exterior surfaces of parked aircraft when the temperature of the exposed surface is

below freezing. In addition to frost, mixtures of clear and rime ice are common in icing situations.

Effects of Ice Formation

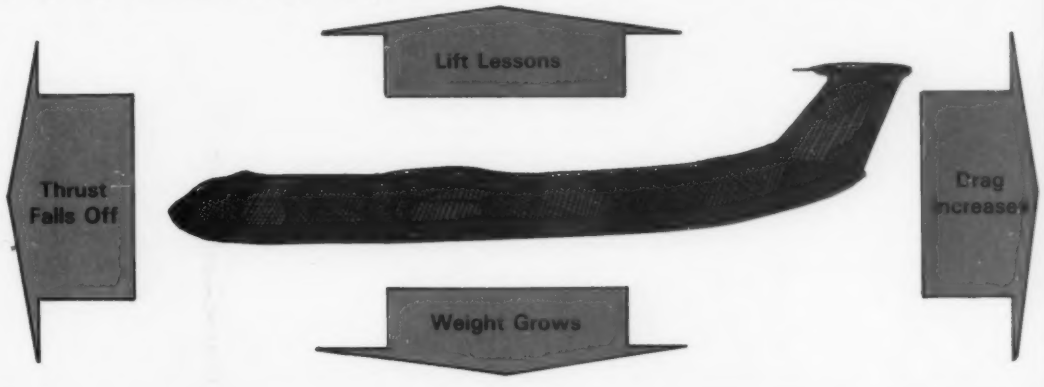
As we've seen, ice and aircraft not only mix together, they stick together, affecting aircraft performance and flight characteristics in a most negative manner. Consider these effects of airframe icing:

- Slight surface roughness can significantly increase stall speed and power required to achieve or to sustain flight.
- Surface roughness due to ice formation on wing leading edges and afterbodies will produce additional drag and further degrade aircraft performance.
- Due to increased stall speed, maneuvers should be more gentle. Airspeed during approach should also be increased in accordance with Dash One guidance.
- Stall angle-of-attack will decrease and, in some aircraft, stall will occur prior to activation of stall warning systems.
- Stall characteristics will change. Depending upon aircraft design, the nature of ice formations can cause either violent stall or a slower progression of stall. In some aircraft, pitch-up tendencies may be greater and roll-off tendencies can be exaggerated.
- Power available may be reduced due to ice formations on propellers or jet engine inlets.
- Trim effectiveness can deteriorate with the accumulation of ice on unprotected surfaces.
- Power failures may occur due to carburetor icing or ingestion of ice particles into jet engines or clogging of fuel tank vents and fuel caps.
- Severe vibration may occur due to asymmetric shedding of ice from propellers or rotor blades. Helicopter autorotation capability can be significantly changed or lost.
- Control surfaces (ailerons, elevators, rudders, and wing spoilers) may freeze in place if water deposits, snow, and deicing fluids are not properly cleaned or drained.
- Wing flaps may be damaged if retracted, with ice adhering to critical areas.
- Landing gear mechanisms may be damaged or frozen in place if not properly cleared of ice.
- Forward visibility may be lost or significantly reduced if windshield anti-icing systems aren't available, aren't properly used, or are incapable of coping with the severity of the icing.
- Radio, radar, and other communication and navigation antennae may be damaged or have their efficiency reduced due to ice formations.
- Ice formation effects may be more apparent in the event of engine failure or other emergencies.
- Flight, engine, and other instruments are subject to error if ice exists on external probes, in pressure lines, or on areas forward of or adjacent to external probes. Typical sources of error are icing of pitot-static probes used for airspeed, altitude, and engine pressure ratio measurements.

Clean Aircraft Concept

Since clear or rime icing or frost may prove hazardous to your aircraft's health, it's prudent to take the proper precautions. Should we find ice formations on our aircraft, MAC's

Effects of icing are cumulative, causing stalling speed to increase.



operational practice is to clean the plane using deicing fluid.

The basic philosophy of using freezing point depressant fluids (FPD) for aircraft deicing is to decrease the freezing point of water either in the liquid or crystal (ice) phase. FPD fluids are very soluble in water. However, the rate at which ice will absorb FPD or melt is very slow. Repeated applications of FPD fluids may be necessary to get the aircraft completely deiced.

USAF aircraft are deiced in accordance with T.O. 42C-1-2S-1, "Anti-icing, Deicing and Defrosting of Parked Aircraft." Although a maintenance technical manual, the T.O. has useful information for operators. The Air Force uses anti-icing and deicing/defrosting fluid, specification MIL-A-8243, for snow, frost, and ice prevention and removal from parked aircraft. The fluid is used in two ways. Type I fluid is composed of propylene glycol with inhibitors, a wetting agent and water. Type II fluid is composed of ethylene glycol and propylene glycol in a 3:1 mixture with inhibitors, a wetting agent and water.

A good preflight following ground deicing should include the following general items:

- Wing leading edges, upper surfaces, and lower surfaces
- Stabilizing device leading edges, upper surfaces, lower surfaces, and side panels
- High lift devices such as leading edge slats and leading or trailing edge flaps
- Wing lift spoilers
- All control surfaces
- Propellers
- Rotor blades, rotor heads, and controls
- Windshields
- Antennae
- Exposed instrumentation devices such as pitot-static pressure probes and static ports
- Fuel tank and fuel cap vents
- Cooling and APU air intakes and exhausts
- Landing gear

Now that your aircraft is squeaky clean of ice, snow, and frost, a release for takeoff is in order.

Pretakeoff

The only method currently known to positively confirm that an aircraft is clean of snow and ice prior to takeoff is by a close inspection. A good time for the final check is just prior to the aircraft taking the active runway. In our larger passenger and cargo aircraft, a good rule of thumb is to scan for ice on aircraft surfaces both from the cockpit and from the best vantage point within the cargo compartment.

Crewmembers may elect to open windows, doors, or hatches to improve the view. At night, the crewmember must rely upon wing and other aircraft lights. Even these may not provide sufficient reflection to make the appropriate visual observations. If needed, ask for the assistance of qualified ground personnel to help you complete your final visual check. In all cases, *if the AC can't be sure the aircraft is clean, don't attempt the takeoff.*

Assuring the Clean Aircraft Concept

As fliers, we must be aware of how icing can affect our aircraft, and a review of "Weather for Aircrews" can give us the basics. In preparing for winter operations, we should also review our Dash One "cold weather procedures."

Consider also a more specific study on deicing. Whether at home station or en route, we all need to know more about ground deicing and anti-icing procedures. If you would like to learn more about it, try a visit to your friendly wing maintenance folks. They have the unheralded, yet vital, task of keeping our aircraft free of snow and ice. And they have firsthand deicing and snow removal experience gained from many years of battle against winter storms.

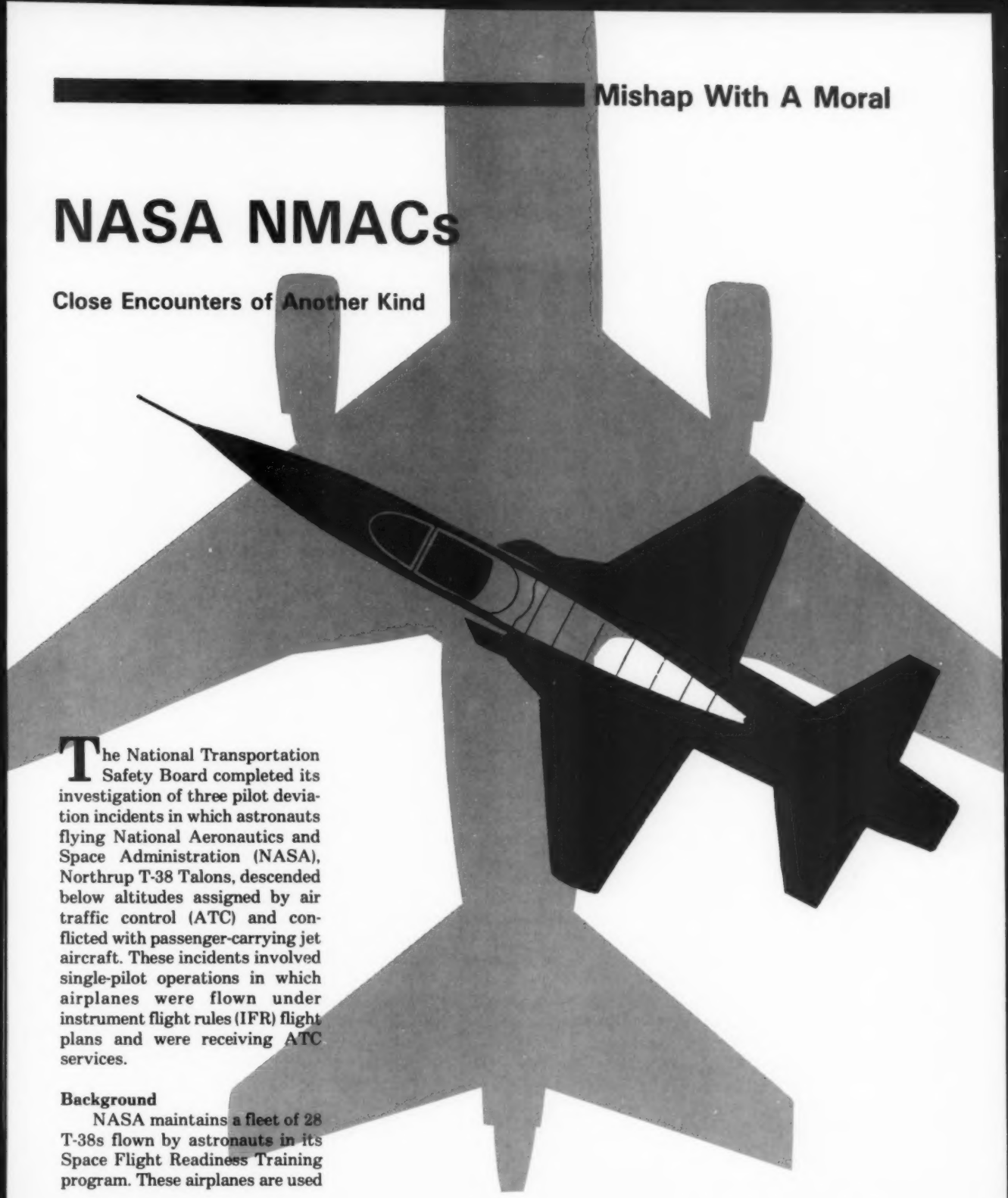
Conclusion

The January 1982 crash of Air Florida Flight 90 in Washington, D.C., with the loss of 78 people, is a somber reminder to us all of the necessity of removing snow, frost, and ice formations from our aircraft prior to flight. In this mishap, the NTSB determined the probable causes were: (a) the flightcrew's failure to use engine anti-ice during ground operations and takeoff; (b) their decision to take off in spite of snow/ice covering the aircraft's wing surfaces; and (c) the Captain's failure to reject the takeoff when his attention was called to improper engine instrument readings. These combined effects, along with the setting of lower-than-normal thrust by reference to erroneous EPR indications (due to ice-blocked inlet probes), led to a condition from which the crew couldn't recover.

Icing, if not heeded, can be unforgiving and deadly. Let's stop this winter weather hazard from making victims of any of us this year.

NASA NMACs

Close Encounters of Another Kind



The National Transportation Safety Board completed its investigation of three pilot deviation incidents in which astronauts flying National Aeronautics and Space Administration (NASA), Northrup T-38 Talons, descended below altitudes assigned by air traffic control (ATC) and conflicted with passenger-carrying jet aircraft. These incidents involved single-pilot operations in which airplanes were flown under instrument flight rules (IFR) flight plans and were receiving ATC services.

Background

NASA maintains a fleet of 28 T-38s flown by astronauts in its Space Flight Readiness Training program. These airplanes are used

for flight proficiency and as transportation. The airplanes are operated from civil and military airports throughout the United States. There are currently 47 astronauts designated as either commanders or copilots of the space shuttle. This group of pilots is required to fly and remain current in the T-38. There are 48 other astronauts, known as Mission Specialists, scheduled to be aboard the shuttle but not designated as its pilots. Of these 48, 10 are qualified pilots maintaining military currency by flying the T-38.

Details of the Incidents

On 15 May 1989, an incident between NASA N920NS (NASA 920) and a Pan American World Airways Airbus A-310, N806PA (Clipper 140) resulted in a near-midair collision (NMAC). The incident occured about two miles northwest of Washington/Dulles International Airport, Washington, D.C., at about 1841 local time. NASA 920 descended through an assigned altitude of 8,000 feet to an altitude of 7,000 feet, after having acknowledged to the controller, ". . . down to eight." Clipper 140 had been assigned 7,000 feet. The Captain of Clipper 140 stated the T-38 passed about 250 to 500 feet directly in front of his airplane, at the same altitude. The Clipper pilot had no time to take evasive action. The NASA 920 pilot stated he did not see Clipper 140, but expedited a climb to 8,000 feet after receiving a traffic advisory from ATC. The flightcrews of both airplanes stated that, at the time of the incident, they were flying between cloud layers. They described the weather as "very scuddy" with no clear horizon, and forward visibility of one-half mile. ATC-recorded radar data indicated the minimum distance between the two airplanes was 100 feet vertical and 700 feet lateral.

On 17 September 1989, about 1447 local time, NASA 923 descended below its assigned altitude of FL330 and conflicted with N812BJ, a Piper Cheyenne, at FL310. The incident occurred 55 miles northwest of El Paso TX, in visual meteorological conditions. The pilot was returning from an astronaut training activity at Edwards AFB CA, and was en route to Ellington Field TX. Recorded radar data indicated the aircraft passed each other with 1,400 feet of vertical and 3.1 miles of horizontal separation. Neither flight reported visual contact with the other.

On 6 May 1990, at 1647 local time, Memphis Air Route Traffic Control Center (ARTCC) cleared NASA 918 to descend from FL390 to FL370 near Paducah KY. NASA 918 acknowledged and read back what sounded like FL370 to the controller. However, the pilot descended below FL370 and conflicted with an Eastern Air Lines DC-9, Flight 222, in level flight at FL350. The NASA pilot advised safety board investigators he thought the controller said to descend to FL270. The incident occurred in visual meterorological conditions. Recorded radar indicated the airplanes came within 1,500 feet vertically and 3 miles horizontally of each other. Neither flight crew reported visual contact.

The safety board reviewed the FAA's records for other pilot deviations involving NASA T-38 aircraft. In addition to the incidents investigated by the board, there were two incidents in 1986 and two in 1989 involving altitude deviations. The safety board notes that all these incidents, except one in 1986, involved deviations on descents below assigned altitudes. NASA personnel said they receive as many intermediate altitude assignments from ATC for climbs as they do for descents.

Investigation

Safety board investigators reviewed the pilots' training records, proficiency and instrument checks, the extent of recent flight experience, and medical evaluations for the three incidents cited. The pilots were fully qualified to fly and met or exceeded the minimum training and operational standards established by NASA.

During personal interviews, the pilots of NASA 920 and 923 could not provide definitive reasons for their altitude deviations. Despite their acknowledgement by repeating the proper altitude clearances, the pilots inadvertently continued their descents to improper altitudes. Neither of the pilots had written the clearances on their "knee boards" because they said that they did not consider the clearances to be of sufficient complexity to warrant that action.

The pilot of NASA 920 described his cockpit workload as "busy" and further commented that in the T-38, "with all you've got to do, it's real easy to not remember what altitude you're supposed to be going to."

Recommendations

The safety board believes that NASA's use of the T-38 is unique. The T-38 is a high-performance airplane capable of supersonic speeds. Moreover, it's the only tactical-type airplane used extensively in the National Airspace System (NAS) that has a second crewmember seat which doesn't need to be occupied by a qualified crewmember on most flights. Although the military operates single seat fighter airplanes in the NAS, those flights are, for the most part, in groups of two or more. Most other IFR flights operating in the same environ-

ment as NASA 920, 923, and 918 include two or three cockpit crewmembers. In addition, these other airplanes are, by design, inherently more stable than the T-38. Most are equipped with autopilots, dual radio frequency selection capability, flight directors, and altitude alerters, all of which enhance safety.

The T-38, as currently configured and operated by NASA, is a high workload airplane. The cockpit is small, thereby posing problems for ergonomic design considerations. When the airplane is flown at high altitudes, the controls are quite sensitive, and the pilot must devote considerable attention to control of the airplane. If flying when thunderstorms are present, the lack of weather radar increases workload. The radios and their respective controls are positioned at various locations throughout the cockpit. The substandard quality of the radio reception and transmissions causes pilots to have to strain to understand air traffic control instructions; occasionally, the pilots must request controllers to repeat instructions. If a route is changed, the location of the map storage areas on the T-38 requires the pilot to turn his head and reposition his entire body in order to retrieve the needed item. A routine task, such as reviewing a book of STARS, requires two hands and is difficult without the use of an autopilot. All of these situations increase a pilot's workload and, for single-pilot operation without an autopilot, the workload is increased to an even greater extent.

The crew concept using multiple flight crewmembers serves two purposes. It reduces workload by allowing one pilot to fly the aircraft, and the other to handle communications and/or record clearances, set and verify navigation equipment, complete checklists, and perform other required cockpit duties. By reducing the workload, fewer mistakes need to be corrected. The crew concept also serves as a redundant feature for recognizing errors after they occur.

The safety board believes the primary reason so many of NASA's T-38 altitude deviations were on descents, rather than climbs, is a fatigue factor. Because the T-38 is a high-workload airplane, the safety board believes a type of short-term fatigue develops which results in a decreased amount of attention available for communicating with ATC. Consequently, descents at the end of a flight, coupled with short-term fatigue, produce a higher probability of human error. If the second seat is occupied by another pilot or mission specialist, the descent below assigned altitudes probably would be recognized and corrected before a dangerous situation develops. For flights conducted in high-density terminal environments, the addition of a second flight crewmember becomes even more critical, especially when instrument meteorological conditions are forecast. The safety board notes that use of an autopilot is an asset in reducing cockpit workload. However, NASA advised investigators that the use of an autopilot in the T-38 is inconsistent with the training objectives of its Space Flight Readiness Training program. Flying the airplane manually provides desirable pilot training because the "hands-on" feel of the T-38 is similar to that of the space shuttle.

The safety board believes that through appropriate scheduling, NASA's 38 mission specialists, who are not pilots, could be designated to fly in the rear seat as flight crewmembers for all T-38 flights. These specialists are required to maintain a level of currency and proficiency in the airplane and are trained to perform specific duties. These duties include: (1) retrieval and briefing of weather information, flight planning and briefing of the T-38 mission; (2) operating communications and navigation equipment; (3) monitoring progress of the flight and advising the pilot concerning altitudes and airspeed; and when appropriate, (4) providing checklist challenge and response. In the current program, after mission specialists receive 200 hours of total time, they are required to fly an average of 4 hours per month. The pilots are required to fly about 15 hours per month. The three incidents investigated could have been averted by a second crewmember. The safety board, therefore, believes that NASA should encourage the use of a second flightcrew member for all T-38 flights operating in the NAS and require, pending workload reducing avionics upgrades, the use of an additional flightcrew member for all T-38 flights in selected high density terminal airspace.

Application to MAC

It's safe to say those pilots chosen to participate in the Space Program are exceptionally skilled. Yet, when it comes down to long flights in controlled airspace, even those with "the right stuff" can make mistakes. Pilots familiar with the "crew concept" should not be surprised that the FAA's solution to the NMAC incidents was the addition of the second crewmember. After all, we've proven time and time again that no matter how skilled the person in the left seat is, the crew, working together, consistently provides a greater amount of flying ability than what any "superpilot" can do alone.

Adapted from: *NTSB Safety Recommendation A-90-156 through -159.*

Project S.T.A.R.T.

Safe Terminal Air Route Training

The specter of the midair collision like that of a twin engine Aerostar and a Bell helicopter which collided near Philadelphia, killing seven, including U.S. Senator Heinz, haunts every pilot. A midair collision is the ultimate aviation horror because it implies that someone, somewhere, failed to perform a pilot's foremost responsibility toward his or her passengers, seeing and avoiding another aircraft. Often, this is a momentary failure that exacts innumerable costs in lives and property, and every pilot feels the fall-out when one occurs.

In the FAA Western-Pacific Region, an enterprising inspector collected local near midair collision (NMAC) reports and plotted each occurrence on a Los Angeles terminal control area (TCA) chart. What emerged was a "clustering" of NMACs at 16 definite locations. He then plotted recommended VFR flyways, followed by plots of Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs) for the Los Angeles area. A startling, unexpected pattern emerged.

Without a miss, each of the 16 NMAC clusters lay where a VFR fly-way crossed a SID or STAR.

Locations of potential disasters had been found, and lack of communication among airspace users hindered efforts to head off disaster. What if someone could bring together all these elements? What if general aviation pilots could explain their position in such a way that airline and military pilots, air traffic controllers, and the public could understand their views? What if airline pilots could demonstrate what the issue looks like from their cockpits? What if air traffic could break away from the radar room and see the pilots' point of view while sharing their own? Could someone get them together and talking?

The FAA accepted this challenge and is working through their Flight Standards District Offices (FSDO), and specificaly the local Accident Prevention Program Manager (APPM) to present a NMAC program tailored to the local flying environment.

Honolulu, served as the guinea pig for the first full-scale presentation of the program, officially dubbed "Project START." In Honolulu, the problem was not the clustering of NMACs around SID/STAR and VFR flyways, but rather that VFR routes for tour flights intersected routes used for military training. The Honolulu FSDO gathered a working group of general aviation, air carrier, military, and air traffic control. As a result of joint cooperation, the military agreed to shift some training routes away from the VFR traffic. Futhermore, evidence of the NMACs plotted on a chart was so convincing that air traffic received a new radar site.

You might ask, "when and under what conditions am I likely to be involved in a NMAC?" The first part of the FAA program answers this question. If you are flying in daylight, in VMC, between the hours of 6 A.M. and 6 P.M., on a weekend, at an altitude somewhere between the surface and 6,000 feet AGL, en route on an IFR flight plan, you are the ideal candidate for a near midair collision. During the first part of the program, the FAA emphasizes the use of the best known collision avoidance device: the pilot's eyes.

After this introduction, the FAA APPM presents results of his plotting NMAC reports on a local area chart. This is meaningful information for pilots who see familiar sites and landmarks. It brings the problem "home" and makes the pilot aware of the "hot spots."

The next module of Project START is intended to be presented by an airline pilot. His job is to highlight the physical differences in airline equipment and procedures, compared to general aviation, which keep the airline pilot's head in the cockpit for prolonged periods. This explanation extends into aircraft design and engineering. A pressurized aircraft must be structurally strong enough to withstand the force of pressuration. Glass detracts from structural integrity, so its use must be keep to a minimum. Therefore, pressurized aircraft have small windows with wide posts between them. A typical light general aviation cockpit may have several square feet more glass area than the cockpit of an airliner, and thus fewer blind spots.

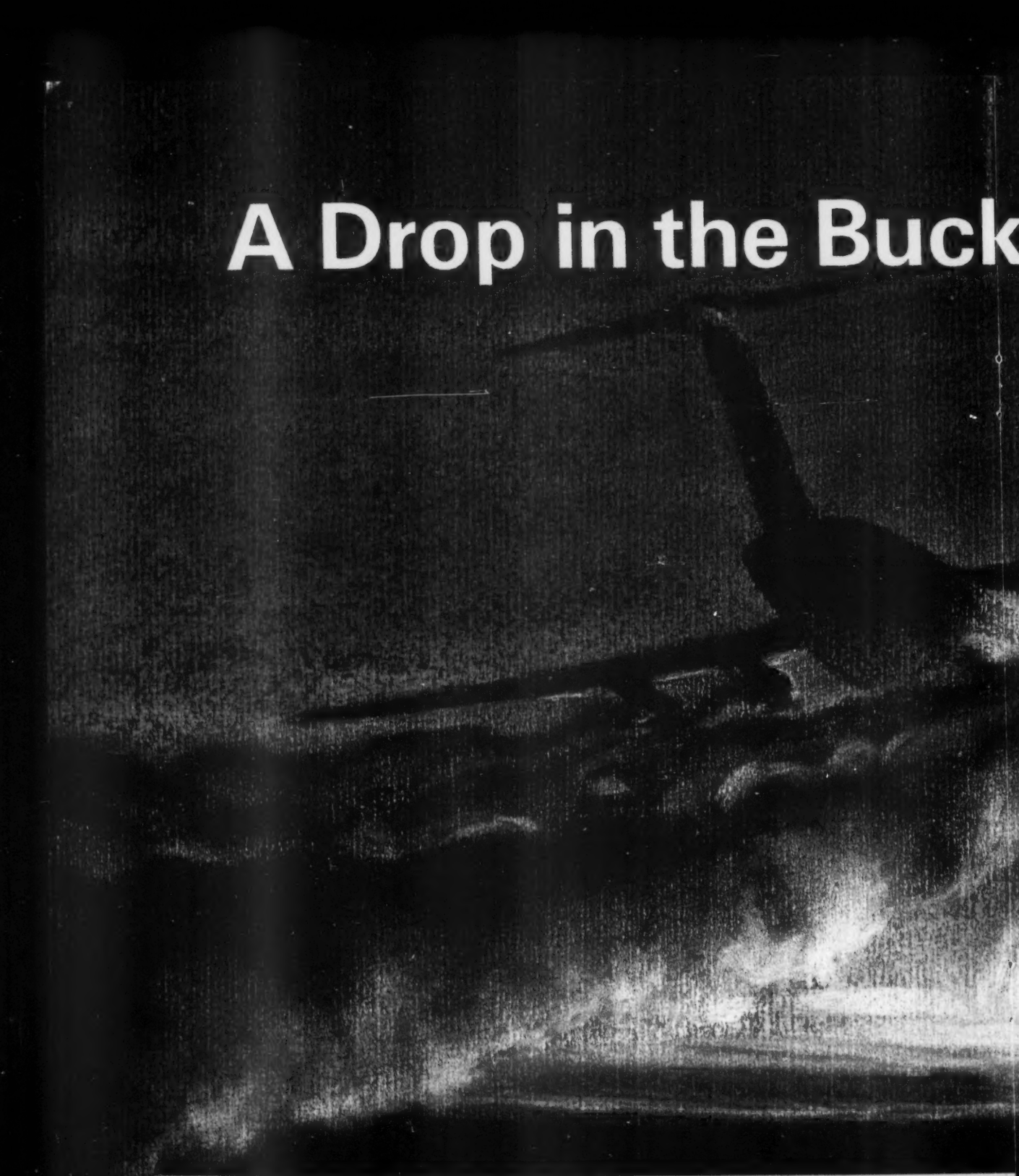
Furthermore, by regulation, airline pilots have more extensive checklists, which preclude pilots from looking outside as much as they would like. As well, there are more instruments and dials to check. There is more information to be entered into onboard navigation computers, and more frequencies to tune and check. All of these tasks keep the pilot's eyes inside. SIDs and STARs, in some areas, are so complicated and have so many frequency, radial, and altitude changes, that pilots must consult them constantly to assure they're following the procedure correctly. Even the physical layout and position of the cockpit can affect the pilot's scanning time and ability. Analog instruments and dials scattered about the cockpit require a longer inside scan to integrate vital information. Development of ergonomic cockpit designs, heads-up displays, Enhanced Flight Information Systems, and streamlined checklists would help get the heavy aviation pilot's eyes back outside where they do the most good.

Controllers from a Terminal Radar Approach Control (TRACON) address the next segment. They present an overview of the area TRACON covers, and the services it can provide. The controller describes equipment used, its limitations, and emphasize they are there to serve all pilots.

The National Accident Prevention Program plans to institute Project START in each of the FAA's nine regions. However, that does not mean your local safety office cannot begin an informal Project START. Instead of sharing near midairs only in your hangar flying, you can plot close encounters on a sectional chart and compare results with the type of airspace nearby. Draw your own conclusions and pass the information on at the next safety meeting. Get in touch with your FAA APPM and let him know you're ready to help reduce the potential of a midair collision.

Adapted from: *FAA Aviation News* article by Phyllis Duncan.

A Drop in the Buck



HONORABLE MENTION 1991 MAC FLIGHT SAFETY WRITING CONTEST

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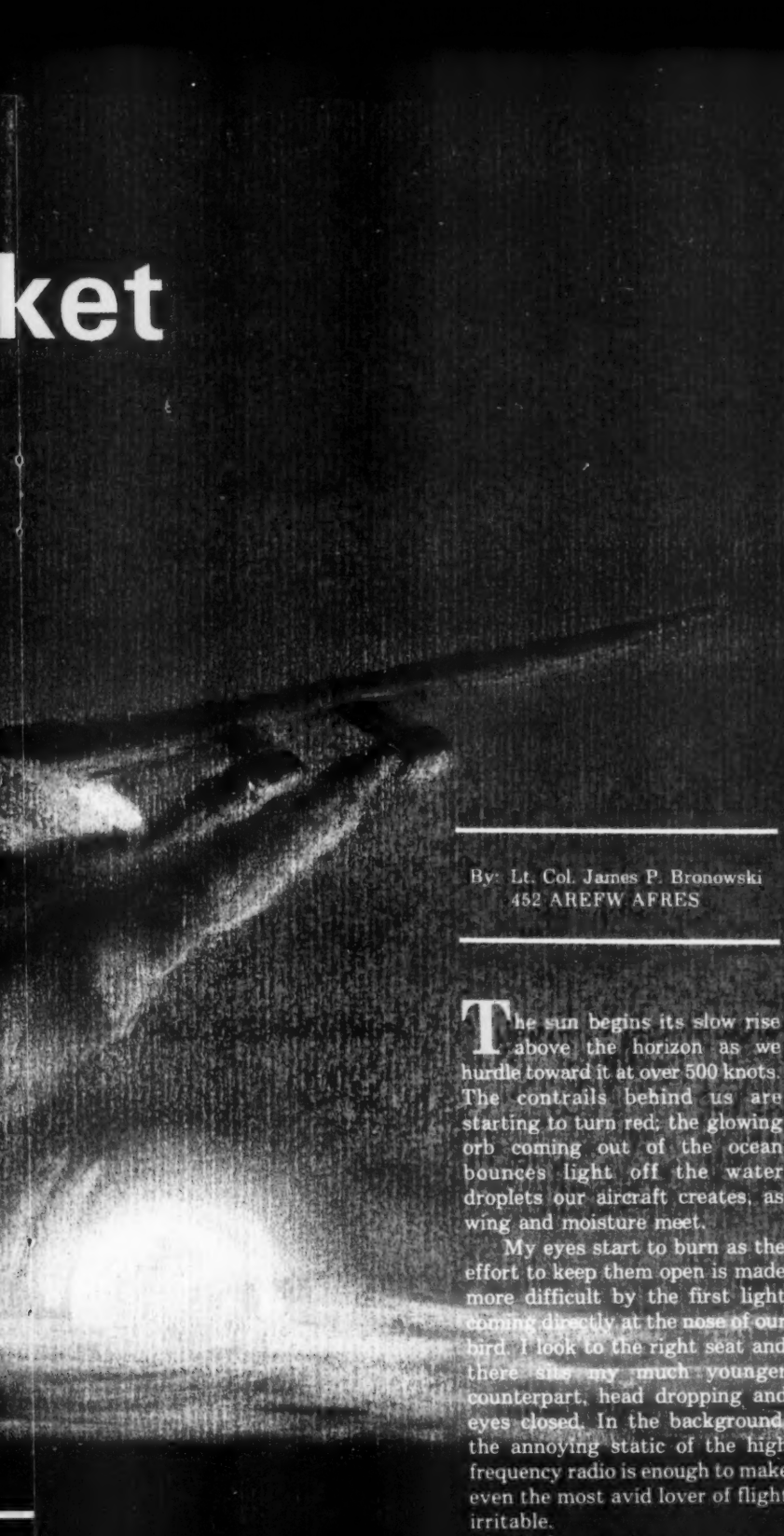

By: Lt. Col. James P. Bronowski
452 AREFW AFRES

The sun begins its slow rise above the horizon as we hurdle toward it at over 500 knots. The contrails behind us are starting to turn red; the glowing orb coming out of the ocean bounces light off the water droplets our aircraft creates, as wing and moisture meet.

My eyes start to burn as the effort to keep them open is made more difficult by the first light coming directly at the nose of our bird. I look to the right seat and there sits my much younger counterpart, head dropping and eyes closed. In the background, the annoying static of the high frequency radio is enough to make even the most avid lover of flight irritable.

The engineer seems mesmerized by the partially lit panel in front of his glazed stare. He is lost in thought. I know, however, he is only a noise or light cue away from effectively responding to the needs or complaints of this gentle lady—our temporary home over five miles above the earth.

The crew has become extremely quiet. What was an hour ago a cockpit full of animated discussion about noisy quarters, greasy food, and great purchases at the last stop, now has the atmosphere of an elevator full of strangers. Not only has the talking stopped, but the physical movement has diminished to the point where only the most necessary body activity is attempted. If eye movements alone will suffice, no use moving the whole head. It's easier to tolerate the noise than adjust the radio panel.

This is a good crew—sharp, professional. Yet we speed along with senses dulled, only a fraction of a second away from any number of possible emergency conditions requiring immediate action to keep flesh and soul together.

I look over at the right seat again. Here, with head swaying in rhythm to the rocking movements of the giant craft, sleeps the proverbial flower of American youth. I envy his youth and energy, but at this moment, it's "pops" who has the helm and tiller.

Someone is trying to make a position report on the radio. The response of the ground controller is weak and almost unreadable, with a heavy accent, making communication from the stratosphere nearly impossible. We can walk on the moon, but we are slaves to radio technology best described as "classical."

I yawn. Not just a minor yawn, but a healthy man's yawn. One that commands attention—

one that seems to put demands on the maximum output of compressed air the laboring engines can pour into this aluminum shell to keep us comfortable and breathing.

I ache the aches of tired aviators everywhere. The back, the legs, arms, and even the mind. Yes, the mind aches from the rigors I have imposed on it . . . the calling up of thousands of bits of information, then using its logic capacity to make hundreds of decisions, big and small. Like my flesh and bone it cries for rest . . . for some respite from constant use at a time of day when it is normally shut down and recharging.

My mouth and throat feel like sandpaper. The extremely dry air inside our high altitude, sealed tube, silently robs the body of precious moisture while we sit mostly immobile and sedentary in our airborn thrones. Everything is adding up to a discomfort factor ranking right up there with ten rounds against Mike Tyson.

We have been on the road 11 days, rotating back and forth between the east cost and Europe. Our crew rest has been by the book, but cumulative fatigue is really starting to take its toll. Still, we have six more days of flying before we head home. It seems light years away.

Bright light now floods the cockpit as the sun shoots above the horizon as if catapulted from somewhere beneath the water ahead. As I squint to protect my eyes from the intense light, the temptation to just leave them closed, and not have to tolerate this visual pain, is almost overpowering.

Oops! I'm starting to drift. I know I'd better do something about it right now or I'll be asleep in a few seconds.

I turn to the flight engineer—not an easy effort in my present physical state. I can almost hear the creaking and popping of bone and muscle.

"Hey plumber, how's the fuel looking?" I ask, remembering after I speak that flight engineers don't particularly like this connotation.

There is distinct pause as the invisible wheels start spinning and the cognitive process slowly comes to life for the man in the side-facing seat.

"Looking good, sir," is his response as he rechecks gages and makes a notation on the log spread in front of him. He starts a measured scan of his panel and busies himself in a series of small tasks overlooked during the past few minutes.

The copilot's head snaps upright and he blinks in reaction to the bright light in front of him. His next action is a quick sideward glance at me to see if he got caught asleep at his post. He did, and embarrassment is written all over his face.

"Sorry, sir, I must have dozed off," he mumbles.

A contrite apology must be accepted, especially if given in sincerity. But not too quickly, or I will lose face.

I peer over the top of my military issue wire-framed bifocals like a judge ready to issue a sentence, and deliberately let some time pass before I issue judgment. I note that the flight engineer is eagerly awaiting my verdict.

"You were out for about 45 minutes," I let the young man know in a most serious tone of voice.

Was it that long ago that I was in his seat? Did I not have the same fear and respect of that seasoned veteran, or "old dude," occupying the driver's seat—someone in their 30s who had seen and experienced every adventure known to man; someone able to actually talk to and caress an aircraft so it would obey the laws of aerodynamics and maintain airspeed and altitude as if the instruments were frozen in place?

It was years, or maybe minutes ago, that I obeyed the commands of landing gear "up" or "down," and set the flaps wherever I was directed by the one who commanded the ship. Here now sits the young aviator awaiting punishment or penance in the place I spent my apprenticeship.

I know that aircrew members will not admit to extreme fatigue or tiredness if everyone else is hanging in there. It's part of our macho image and one of our great weaknesses. Unfortunately, it can also kill us. Recent studies have shown that cumulative fatigue, jet lag, and circadian rhythm disruptions can seriously affect performance; they were the cause of a lot more "pilot error" accidents than originally thought.

The individuals to my right and behind me would most likely admit to having spent 8 to 10 hours in the sack before bus time. What they probably wouldn't know is how much quality sleep they actually got. Strange beds and poor diets are not conducive to good rest, and messing with one's circadian rhythm takes a real toll on the body.

My fellow pilot had waited long enough for his admonishment.

"Do you feel better now?" I ask pleasantly.

"Yes sir, as a matter of fact I feel a whole lot better," he answers. The puzzled look on his face indicates his assumption that

I am setting him up for the hammer.

"Let me give you a little advice, lieutenant," I continue.

His eyes lower instinctively to the "here it comes" position as he awaits my wrath.

"You fell asleep because you had to. Your body needed a recharge and since things were quiet and there was very little mental or physical activity, your brain turned off the lights for a while. It was an involuntary response to a physical need."

Sensing the reprieve from his transgression, he eagerly joined in the conversation.

"I was really beat, sir. I just couldn't get to sleep yesterday afternoon. The harder I tried, the wider awake I became."

"Every person in this aircraft is in the same predicament. No one got any quality sleep before this flight. The human body just can't rapidly adjust to changing sleep periods; the sleep you lose on these trips adds up to cumulative lack of sleep. It can set you up for an aircraft mishap."

"Then how do we safely accomplish the mission and keep from buying the farm," he asks?

Before I answer, my mind flashes back to the times I've fallen asleep at the controls of various aircraft. One time in particular stands out. Had not my guardian angel chosen to pick that particular moment to let my reserve tanks run dry and temporarily stop the engines, I would most likely have slowly descended into the Vietnamese jungle, alone and asleep in my 0-2A, on that dark night so many years ago.

"There are several things you can do," I continue. "First you must recognize the symptoms of extreme fatigue in yourself and the rest of the crew."

"How do you do that?" he asks.

"If you notice you're missing radio calls, forgetting to accomplish routine tasks, and getting very irritable, you're most definitely fatigued. Another good sign is aches and pains that weren't there earlier."

"How can you recognize fatigue in others?"

"If the cockpit becomes silent and physical movement seems to noticeably subside, bodies are slowly shutting down—it's time to do something about it."

"What can you do?" he questions with a slight tilt of the head.

"If you have extra crewmembers, rotate them through the positions on a regular basis. Make sure you schedule seat changes beforehand so each person knows when he or she is scheduled to rest. It helps you to stay alert if you know you'll have a rest period at a definite time."

"But what about a basic crew like ours with no extra crewmembers?"

"We have to rest in our seats. If we don't, we won't be alert for the final and most critical part of the flight—the approach and landing. A 30-to-40-minute resting of the eyes is very refreshing, and gives an amazing boost to your alertness and attitude. It's just a drop in the bucket for the needed sleep, but it's enough to recharge you and maybe save your life."

All this talk about sleep was starting to make me very tired.

"You shouldn't rest more than 40 minutes or you'll go into a deep sleep," I continue. "If something happens when you're in a deep sleep, you won't be able to respond for several seconds if awaken abruptly. One final thing; let the others in the cockpit know you are going to rest your eyes. It will key them to stay alert and cover for you."

I turn and face forward to indicate the lecture is over. I press back into the seat, lean my head back and feel the sun warm my face.

"Crew, I'm going to rest my eyes," I say with closed eyelids.

For a moment there is a vision of silver airplanes darting around white clouds, and then sleep . . . .

Lt. Col. Bronowski, a faithful and successful contributor to the writing contest, has flown EC-121s, O-2As, KC-135s, and KC-10s during a career spanning over 26 years. A previous squadron commander and a 1989 AFRES Safety Man of the Year, Col. Bronowski is currently the Chief of Safety at 452 AREFW, March AFB CA.

TMF Instrument Quiz

1. Several methods can be used to establish an aircraft on the final approach segment of an approach without the aid of radar vectors. What method does this approach use?
   a. Race Track.
   b. Procedure Turn.
   c. Holding Pattern (in lieu of procedure turn).
   d. Procedural Track.

2. The purpose of flying the procedural track is to align the aircraft on an inbound course to the FAF, at FAF altitude, in the final approach configuration.
   a. True.
   b. False.

3. A procedural track uses only radials and turns to depict the required flight path between the IAF and FAF.
   a. True.
   b. False.

4. Your aircraft heading is 160 degrees and your position is six miles northwest of ELMIRA (ELM). For your entry turn you should:
   a. When over ELM, turn immediately in the shorter direction to intercept the published track.
   b. Use normal lead points to intercept the course, without overflying ELM.
   c. Maneuver the aircraft into a more favorable alignment before starting the approach; obtain clearance from ATC prior to maneuvering.
   d. None of the above apply in this situation.

5. When should you descend from 3,800 feet to 3,300 feet?
   a. When established in the turn from 220 degrees to 061 degrees.
   b. When on a heading to intercept the localizer.
   c. When the aircraft is established on the inbound segment of the procedural track.
   d. When established on a parallel or intercept heading in relation to the inbound track.

6. Your flight director is working only in a manual mode. Manual selection of final approach mode should be delayed until aircraft heading is within _____ degrees of the localizer course and the CDI is within _____ dot(s) of center.
   a. 10 degrees, one dot.
   b. 10 degrees, one and one half dots.
   c. 12 degrees, one dot.
   d. 15 degrees, one dot.
   e. 15 degrees, one half dot.

7. Approach control clears you to descend to 3,000 feet instead of 3,300 feet as published. Where will you intercept the glide slope?
   a. Prior to ZANNA.
   b. Between ZANNA and CHEMU.
   c. Prior to ELM.
   d. After CHEMU.

8. Prior to reaching the glide slope intercept point, you notice the CDI indicates full scale deflection. You should:
   a. Maintain glide slope interception altitude; do not descend.
   b. Descend to localizer minimums (S-LOC 6).
   c. Descend to circling minimums only.
   d. None of the above.

9. The vertical velocity required to maintain the angle of descent needed to stay on glide path is dependent only upon aircraft ground speed.
   a. True.
   b. False.

10. To activate the runway 6-24 lights, the pilot not flying the aircraft keys the mike seven times within 5 seconds on 121.1.
   a. True.
   b. False.

Amdt 2 89348

ILS RWY 6

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AL-131 (FAA)

ELMIRA/CORNING REGIONAL(ELM)
ELMIRA, NEW YORK

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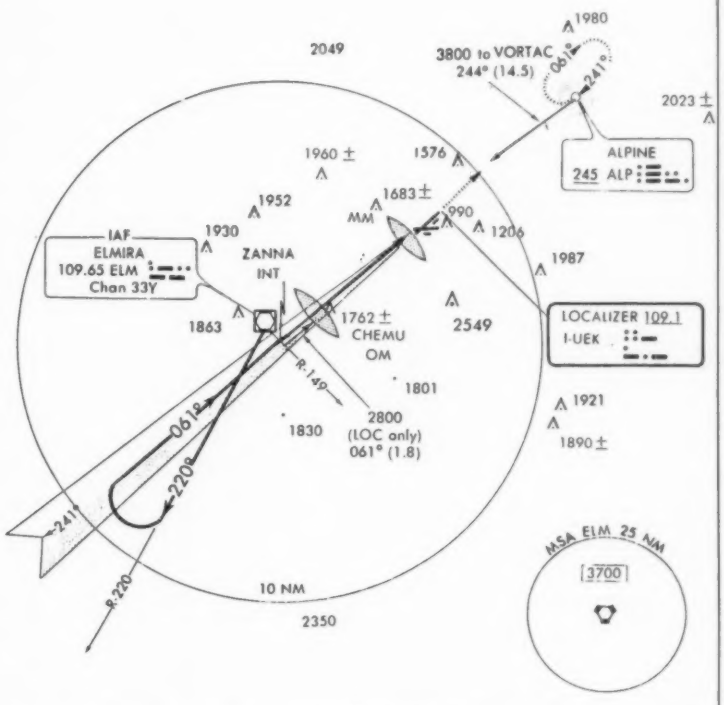
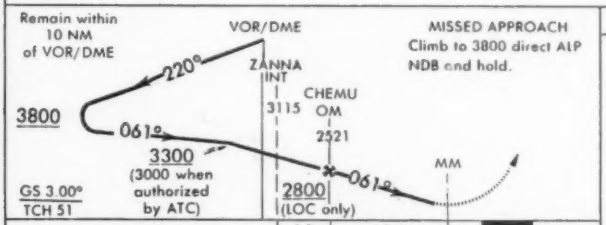
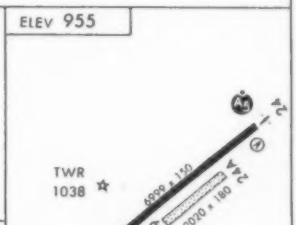
118.15 257.8
ELMIRA TOWER*
121.1 257.8
GND CON
121.9
ATIS 109.65
ELMIRA RADIO
122.4 (CTAF)





CATEGORY	A	B	C	D
S-ILS 6	1144-½ 200 (200-½)			
S-LOC 6	2020-¾ 1076 (1100-¾)	2020-1 1076 (1100-1)	2020-2½ 1076 (1100 2½)	
CIRCLING	2080-1¼ 1125 (1200 1¼)	2080-1½ 1125 (1200 1½)	2100-3 1145 (1200 3)	

When control tower closed, contact ELM FSS for HIRL Rwy 6 24 and MIRL Rwy 10-28.



MIRL Rwy 10-28
HIRL Rwy 6-24

FAF to MAP 4.7 NM					
Knots	60	90	120	150	180
Min:Sec	4:42	3:08	2:21	1:53	1:34

ILS RWY 6

42°10'N—76°54'W

ELMIRA, NEW YORK
ELMIRA/CORNING REGIONAL (ELM)

11. For how long a period will the approach lights be illuminated?
    a. 8 minutes.
    b. 10 minutes.
    c. 15 minutes.
    d. 20 minutes.

12. Runway 6A has what kind of surface?
    a. Hard surface.
    b. Metal surface.
    c. Other than hard surface.
    d. Water surface.
    e. Runway 6A is closed.

13. The missed approach point for any precision approach is the point at which the decision height is reached.
    a. True.
    b. False.

14. When the aircraft is at or near minimums in conditions of limited visibility, the sudden appearance of runway lights often gives the pilot the illusion of being:
    a. Low.
    b. High.
    c. On glide path.
    d. Low and slow.

15. About how far is ALPINE from the localizer missed approach point?
    a. 6.5 nautical miles (NM).
    b. Approximately 8.0 NM.
    c. 14.5 DME.
    d. 14.5 NM.

16. What is the highest obstacle?
    a. 2,023 feet (doubtful accuracy).
    b. 2,350 feet.
    c. 2,549 feet.
    d. 2,800 feet.
    e. 3,700 feet.

THE ANSWERS

1. d. Procedural track. The depiction used is a heavy line showing intended aircraft ground track. (AFM 51-37, para. 12-4a.)
2. a. True. (AFM 51-37, para. 12-1c.)
3. b. False. There is no specific depiction for a procedural track. It may employ arcs, radials, courses, turns, etc. When a specific flight path is required, procedural track symbology is used to depict the flight path between the IAF and FAF. (AFM 51-37, para. 12-4a.)
4. b. If your heading is within 90 degrees of the procedural course, you are not required to overfly the IAF, but you may use normal lead points to intercept the course. (AFM 51-37, para. 12-4b.)
5. c. Where a teardrop is depicted, descend from the turn altitude when the aircraft is established on the inbound segment of the procedural track. (AFM 51-37, para. 12-4d(2).)
6. d. 15 degrees, one dot. (AFM 51-37, para. 13-1b(1).)
7. b. Between ZANNA and CHEMU. Glide path altitude at ZANNA is 3,115 feet; at CHEMU it's 2,521 feet. If you're level at 3,000 feet you'll intercept the glide slope somewhere between the two fixes. (IAP profile view.)
8. a. Maintain glide slope interception altitude (published or assigned) until reaching the glide slope intercept point. Do not descend below glide slope interception altitude if the CDI indicates full scale deflection. (AFM 51-37, para. 13-1b(2)(b).)
9. b. False. The vertical velocity required to maintain the angle of descent needed to stay on glide path is dependent upon aircraft ground speed and ILS glide slope angle. (AFM 51-37, para. 13-1b(2)(c).)
10. b. False. Clicking the mike on 121.1 controls the approach lights for runway 6-24. Contact Elimra Flight Service Station for the runway lights. (IAP, Note below the minimums box.)
11. c. Pilot-controlled lighting remains illuminated for 15 minutes from the most recent time of activation. (Flight Information Handbook, Section B.)
12. c. Other than hard surface. (IAP Legend.)
13. a. True. The missed approach point for any precision approach is the point at which the decision height is reached. (AFM 51-37, para. 15-1c.)
14. b. High. Studies have shown that the sudden appearance of runway lights when the aircraft is at or near minimums in conditions of limited visibility often gives the pilot the illusion of being high. (AFM 51-37, para. 14-2b.)
15. b. Approximately 8.0 nautical miles.
16. c. 2,549 feet.

Why Strat Needs Tactics

Analyzing the Threat

Everyone concedes that tactics are required by C-130s and airdrop C-141s. The people who question the need for tactics seem to be non-tactical airland crewmembers. "Why do I need tactics?" they ask. "I only land in friendly territory on long runways. Why do I need to know how to do a random steep approach?" The Advanced Airlift Tactics Training Center (AATTC) at St. Joseph, Missouri, even received a call from a non-airdrop C-141 unit DO who didn't want the newsletter any more because, "we fly 141s; we don't have any need for tactics." Let's see if he was right.

On any given day, MAC aircraft fly into countries that may not like us. (Sound familiar?) Even in "friendly" countries, terrorists have little problem obtaining weapons that can ruin your whole day. An example of this is the terrorist with an SA-7 who was captured near the Rome airport. Think about the serious effect an SA-7, fired from a roadway near an airport, could have on your aircraft.

How do you know you will only land on a long runway? All C-141 airland crews are supposed to be able to do spot landings (what we Herk people call "assaults"). This gives them the capability to go into some of the "shorter" strips around the world. Along with this option, is the possibility that someone might not want you to land there. This is where tactics come into play.

I am not suggesting that all spot landings will be contested, but there is a possibility that some of them will be. The scenario could be like Saigon in 1975. There, we had to spiral down from altitude within a certain specified secure area around the airport. This tactic could also be used for rescuing hostages, or flying in and out of an airfield temporarily secured in the middle of "bad guy" country. As we have seen recently, the names may change, but the threat doesn't.

This brings us to the question of tactics. Tactics can be defined as the planned response to a known threat based on knowledge and the limits of the crew and aircraft. There is no single tactic that is always right (except possibly *AVOID*), so knowledge of threat capability becomes as important as knowledge of personal and aircraft limits. Remember, tactics doesn't mean flying low—it means flying as high as the threat will allow.

With the current worldwide threat, most of the world's Air Forces and airlines are taking a closer look at their operating areas. Can MAC, with the world's third largest fleet of aircraft, do any less?

Adapted from: *Airlift Tactics*
Newsletter of the Advanced Airlift Tactics Training Center

C.R. TERROR

When the Wind Blows

"Cheated death again," proclaimed the Pompous Pilot to all who were monitoring interphone, as the Starlifter began a rapid climb to cruise after exiting the AOR. "Rest of this mission will be a piece of cake. That's the closest I've been to MiG-25s not parked at some museum. Without my superior aviation skills and tactics, they would have claimed us as a kill."

"Boss, those MiGs looked more like Marine F/A-18s to me. After all, we were flying pretty close to that formation of ships," responded Capt. "Long Suffering" Sam.

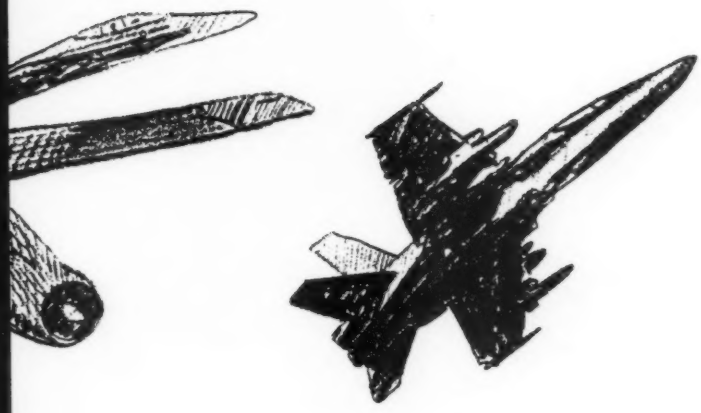
"Tut, tut, Sammy, this event has the makings of a world class legend. We're the first '141 to do a guns-jink-out-maneuver and escape from the sights of the enemy," rambled C.R. as he began to formulate his intel debrief.

"I agree with you, copilot," quipped MSgt. Max Torque. "Those fighters looked like they were getting out of our way. Besides, there haven't been any enemy aircraft flying in months."

Rather than argue the exact nature of the close encounter, the Master Manipulator shifted gears and began expounding on the great crewrest they would enjoy at Windy Point Naval Station. His Marine Corps buddy, Col. Nicholas Rippers, would be there to meet and escort them around town to partake of the local cuisine and night life. Both of those points, plus a high per deim rate made Windy Point a desirable crew rest location, according to the Global Gourmet.

Even more important to C.R., was the Windy Point non-directional stage closing; they wouldn't have to put up with inept stage management or be legal for alert for 12 hours at a time. After listening for several hours to the virtues of crew rest at Windy Point, Sammy began to believe the base had been named after C.R.

"Boss, don't you think it's time to get an update on the weather?" inquired Sammy.



"Of course. You can update the weather, Samuel m'boy. I always follow MAC's magnificent guidance on updating weather prior to arrival. I can assure you, the weather at Windy Point will be just beautiful. Get Incirlik on the line and confirm the forecast."

After the usual HF tuning delay, Sammy was able to raise Incirlik through the hiss and static. Following what seemed like the flight surgeon's hearing test, he was able to copy the current conditions and forecast for arrival time, and pass a PIREP to METRO.

"Chief, it doesn't sound good for getting into Windy Point," began the faithful copilot. "A low pressure system has developed in the area and is forecast to increase in intensity. There are currently showers moving through with gusty, variable winds around 30 knots. The amended forecast for our arrival time calls for variable winds 190 to 280 degrees with gusts to 45 knots. Winds at 190 degrees will be a direct crosswind.

"Sounds like we're going to need to divert to the alternate. Torrejon's CAVOK with winds out of the south gusting to 20 knots. I'll get Phantom on the HF and let them know we are diverting to Torrejon as soon as I can work up an ETA."

"Gadzooks! You believe all that namby-pamby stuff the Dispensers of Weather Wisdom dish out? Crew, we'll be landing at Windy Point! Diverting for crosswinds is not part of my operational plan . . . it's always windy there—where do you think it got its name? Colonel Rippers is expecting us. I've got to show him MAC's finest can handle those puny winds," replied the Dauntles Driver. "We're pressing on for Windy Point . . . those crosswinds are easily tamed . . . they aren't out of my limits yet.

"Besides we're still two hours out with lots of time to develop a plan of attack. If the wind really gets as bad as those pessimistic prognosticators predict, then we can divert . . . but only as a last resort."

C.R. continued boasting of his crosswind expertise . . . starting with landing at Norton during fierce "Santa Ana" winds and continuing with every single crosswind landing with winds greater than 25 knots.

As the Ambient Aeronaut aimed this conversation toward Sammy, Max reached up and deftly turned down the volume of his interphone rather than listen to tales of daring he had already heard too many times.

"Boss," interrupted Sammy, "we're 30 minutes from blocks. Isn't it time to pass a load message to ACP and check on the latest weather?"

"Right you are m'lad. I'll take ATC and get the descent going. You call ACP," directed C.R.

"You might want to hold off on the descent until I've got a current weather picture," responded Sammy.

"Nonsense, I want to make my usual smooth descent. Don't worry about the winds; they'll be within limits for our landing," reassured the Silver-tongued Fox.

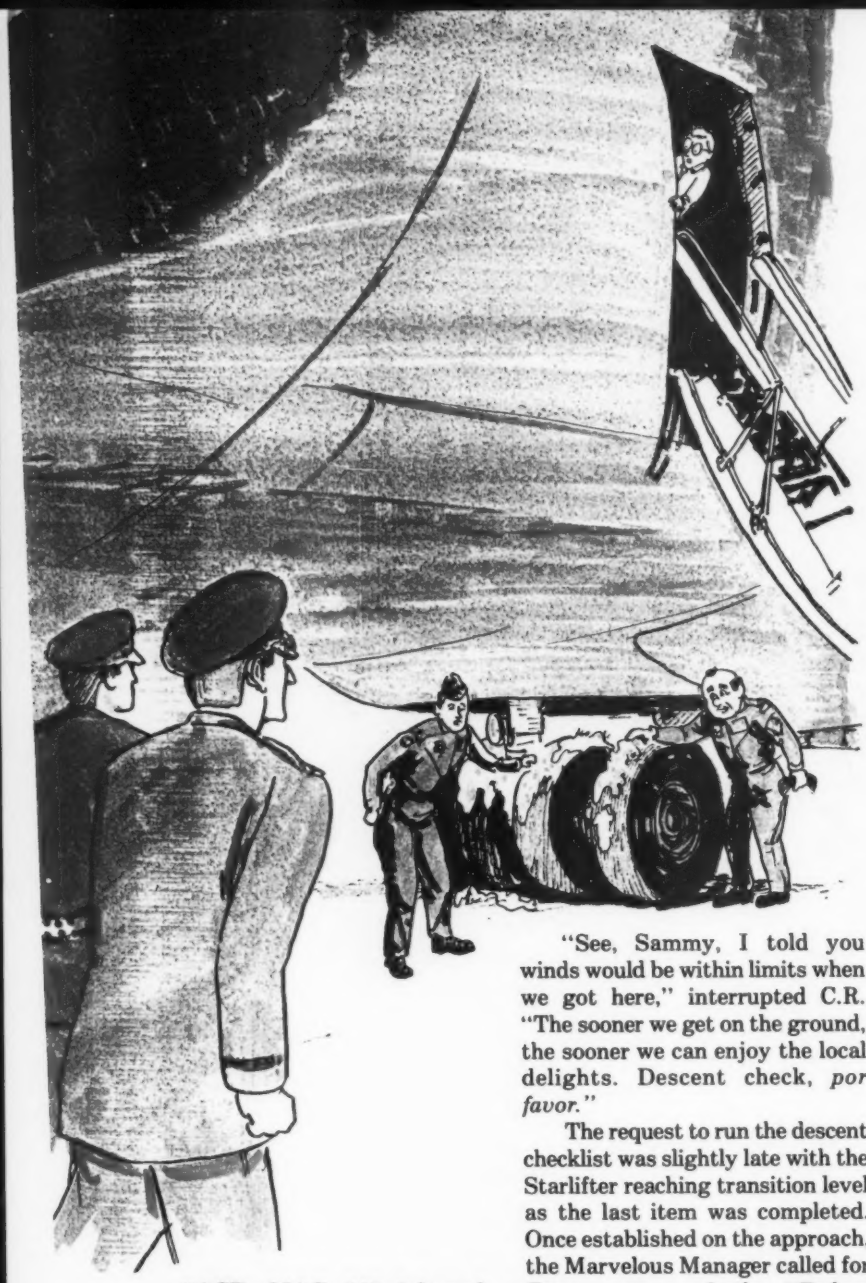
Sammy selected METRO's frequency on the UHF and gave them a call. "METRO, MAC 50246 requesting current weather for Windy Point."

"MAC 50246, Windy Point ceiling currently 3,000 feet; visibility 5 miles; winds variable 190 to 270 degrees at 18 gusting to 35; altimeter 29.87; temperature 21 degrees; runway dry. The wind right now is steady 240 at 28. Can I be of further assistance?"

"MAC 50246, good copy on the weather, thanks." A quick flip of the frequency selector and the trusty copilot was talking to ACP.

"ACP, MAC 50246, estimating your station at 2245, over."

"MAC 246, Windy ACP. Go ahead with your load message, over."



"ACP, MAC 246 inbound with one pallet thru-load, six pax off-load, no hazardous cargo. We may have to divert to our alternate if the winds go out of limits."

"MAC 246, ACP copies your load message. We've had two other aircraft land within the last half hour and they reported winds in limits."

"See, Sammy, I told you winds would be within limits when we got here," interrupted C.R. "The sooner we get on the ground, the sooner we can enjoy the local delights. Descent check, *por favor.*"

The request to run the descent checklist was slightly late with the Starlifter reaching transition level as the last item was completed. Once established on the approach, the Marvelous Manager called for flaps, gear, and the "Before Landing Check." Once again, persistent Sam managed to get the aircraft configured just prior to passing the final approach fix. With gear down and flaps full, the crew was certain C.R. could make an acceptable landing.

About three miles out, Tower reported the winds 30 degrees off runway heading at 14 gusting to 20 knots, which Sergeant Torque computed as a 10-knot crosswind. On one mile final, Tower reported winds equal to a 25-knot crosswind. C.R. put maximum effort into keeping the C-141 aligned with the runway. Being on centerline, or even within 35 feet of it, was out of the question.

Touchdown was in a fairly wing level attitude, just right of centerline. C.R. called for Sammy to deploy the spoilers, causing the nose to pitch up since the Magic Major wasn't keeping forward pressure on the yoke. As the nose rose off the pavement, the aircraft became a very large, fast moving weather vane, aimed at the left side of the runway.

As Sammy struggled to lower the left wing, C.R. skidded the nosewheel across the pavement in an attempt to keep the Starlifter on the runway. It was too late, as the nose and left main gear wheels crunched several runway lights before the Addled Aviator could get the errant aircraft back on the hard surface. By then, the wind gust had died.

"Yeeooww! What a landing," exclaimed C.R. "Nothing that I couldn't handle, however. We'll just taxi to parking and be on our way downtown."

"Boss, isn't that your friend, Colonel Rippers, standing at attention next to the admiral's staff car?"

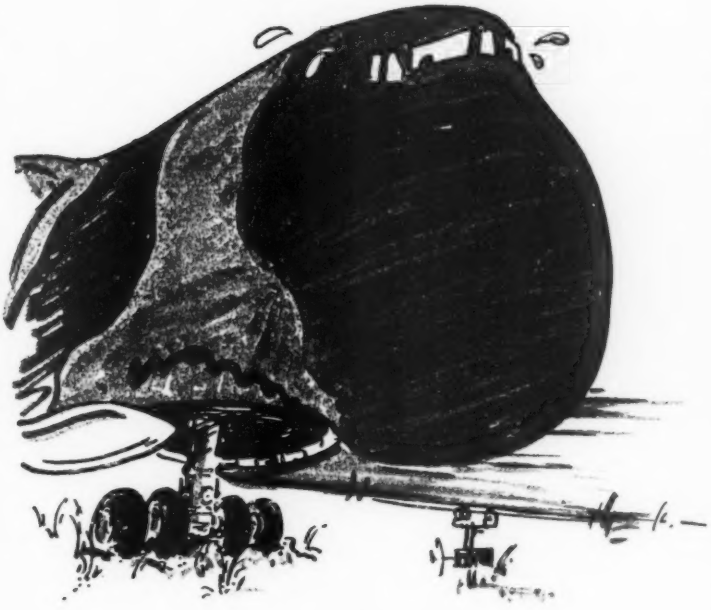
"That's him, Sammy. I guess the admiral wants to be first to congratulate us on our successful evasive actions leaving the AOR."

"I don't think that's what he has in mind," quipped Sammy.

The admiral walked briskly toward them, trailed by Colonel Rippers and several armed Marines. C.R. finally realized that congratulations from the admiral didn't require armed guards and began to cower down in his seat. The mother of all tail chewings was about to occur.

QUICKSTOPPERS

Keep It On The Runway



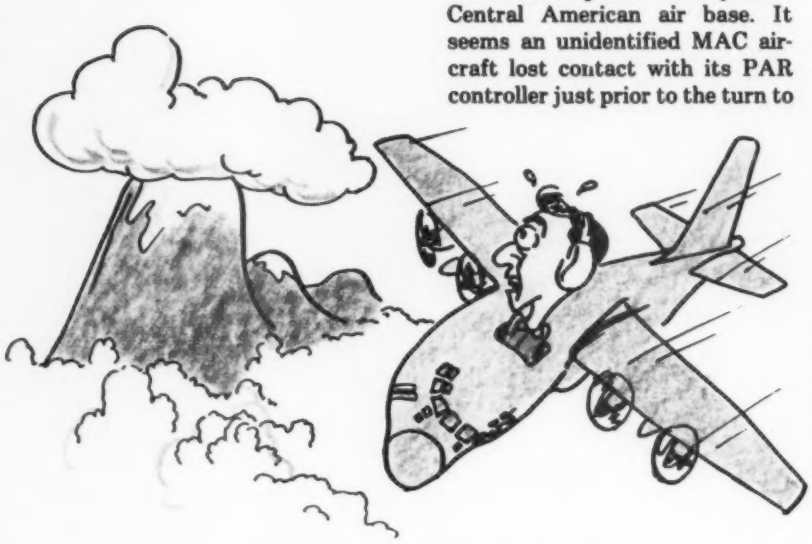
The primary runway of this stateside C-5 base was NOTAMed-closed for rubber removal. Consequently, a C-5 taxiing for takeoff had to back-taxi on a crossing runway and execute a 180-degree turn for departure. Unfortunately, in the course of the turn, the aircraft's nose gear departed the paved surface, ran over two raised runway lights, and damaged six others with flying debris from engine blast. Initial investigation revealed the mishap aircraft was the only one that could have caused the damage. Interviews with the crew showed they were confused about the width of the runway. The aircraft commander initially thought the runway was 200 feet wide because the closed primary runway was of that width. In actuality, the substitute runway was only 150 feet wide. Minimum pavement width for a 180-degree turn with main gear castered is 150 feet. The aircraft commander assumed there was an extra 50 feet above the required width and elected not to do a maximum effort turn. There's that word again—**ASSUME.**

When Training Goes Too Far

This C-130H aircrew was cleared to depart an East-Coast MAC base with a climb to 6,000 feet. On takeoff they noted a C-141 on downwind and stopped their climb at 1,000 feet. Had the '130 pilot not stopped at 1,000 feet, a midair collision or near midair would have occurred. The C-130 advised Tower he had the '141 in sight and would remain below him. On switching to departure, the '130 advised departure control he "had the heavy '141 in sight." The departure controller, unaware of the '141's position, mistakenly thought the '130 was referring to a C-141 on 7-mile final. The departure controller then gave the C-130 a right turn placing him even closer to the '141. Although not directly causing the hazardous situation, this turn inside the ATA was a violation of procedures and prolonged the time required to resolve the situation. Investigation revealed the monitor for the trainee working local control was aware that allowing the C-130 to depart with the '141 on downwind would result in a conflict. However, since the trainee was so close to certification, he was trying to let her catch her own mistake. Unfortunately, the trainer let her go too far before taking action to alleviate the problem. Obviously, instructor judgment as to how far to let a student go isn't limited to cockpits.

QUICKSTOPPERS

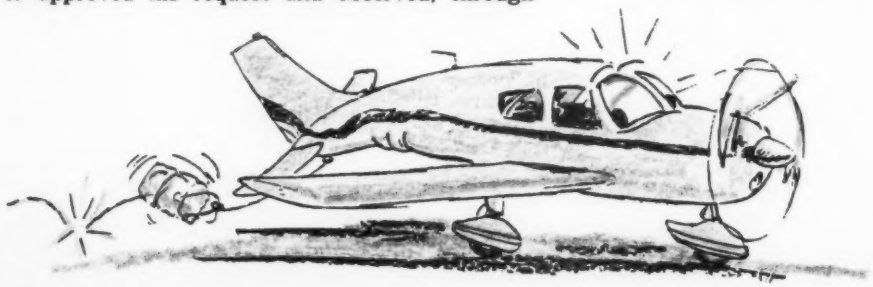
Heads-Up Flying Pays Off



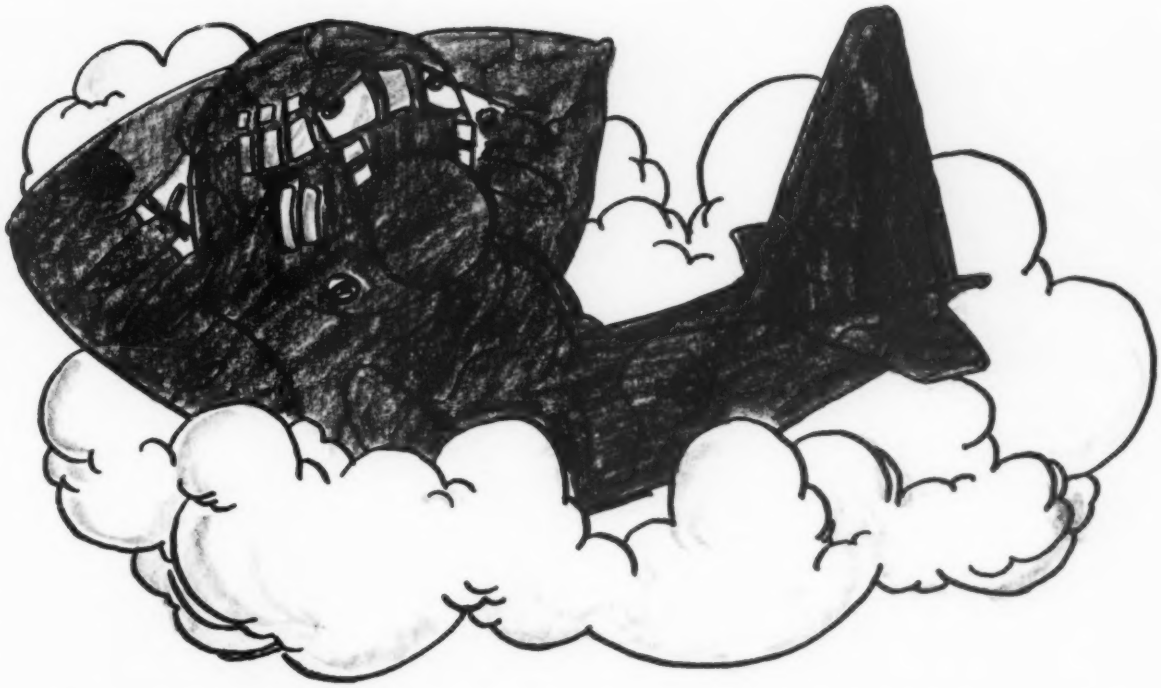
This potentially hazardous situation took place recently at a Central American air base. It seems an unidentified MAC aircraft lost contact with its PAR controller just prior to the turn to base. They received a frequency change and, when they called on the new frequency, nobody was home. Fortunately, this alert aircrew acquired the field visually while on downwind and also picked up a cloud deck obscuring a mountain directly in their flight path. Prior to entering IMC, the pilot alertly turned base and flew back toward the field. They were eventually able to reestablish radio contact and land uneventfully. It seems the aircrew turned a mere 2 miles short of a 7,900 foot mountain. Subsequent discussion with the controller revealed that not only was the discreet frequency inoperative, but the GCA guard frequency was out too. While this discussion was taking place, the PAR also went out. Obviously, it pays to maintain situational awareness.

Tie Me Kangaroo Down, Sport

This is the third British incident report in a six-month period of a pilot trying to fly a light aircraft with a tiedown block still attached. In this case, involving a Piper PA28, the pilot achieved a measure of success in that the tiedown, a cement-filled five-gallon drum, was not removed until the aircraft landed after a cross-country flight. Immediately after landing, the pilot asked Tower if he could hold his position and vacate the aircraft momentarily. Tower approved his request and observed, through binoculars, the airman detach the tiedown weight and roll it to the edge of the runway. He got back into the aircraft and requested taxi clearance. Tower controllers offered to retrieve the object and dispatched a mobile unit to collect the drum. At no time did the pilot advise a controlling agency there was an object suspended from the aircraft. Do you suppose the alien object affected takeoff performance? It certainly must have shortened the Piper's ground roll.



Cleared to Land . . . Eventually . . . Maybe?



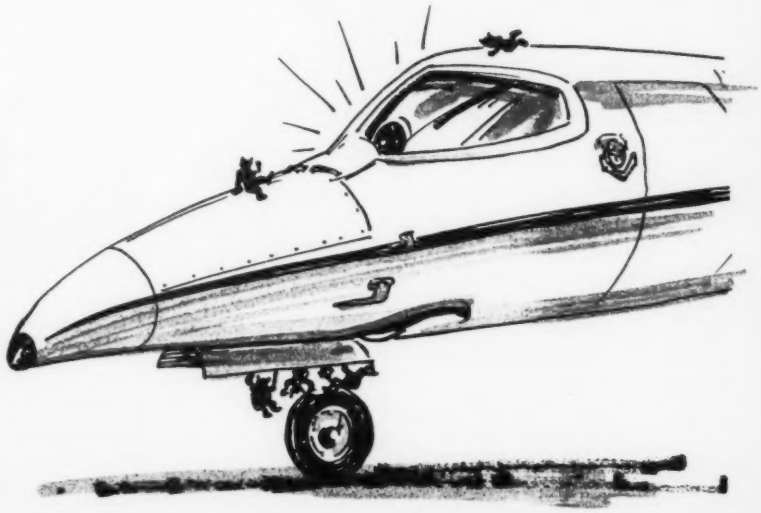
The comedy of errors for this rotational C-130 began on a 7-mile final to runway 17, circle to land on 35, at a Turkish air base. At 7 DME the crew descended out of 2,000 feet as depicted on the approach plate. The tower controller asked the DME and told the crew to maintain 2,500 feet. Leveling at 1,000 feet, the crew noticed three foreign national T-37s taking off directly at them. The Hercules crew turned right (west) to avoid the traffic and climbed to 2,500 feet. Tower then instructed the '130 to turn right and remain west of the airport. The crew did a 360-degree right turn and were told to enter a downwind for a right base to runway 35. As they approached downwind, they were again told to turn right and remain west of the airport. The crew held west for approximately 10 minutes before they were cleared to reenter the downwind. As they approached downwind, they were told to turn right and climb to 3,000 feet. Approaching 3,000 feet, they were told to descend to 2,000 feet and turn left. They received no explanations for the climbs, descents, or turns, and at no time received traffic advisories. After approximately 20 minutes, our dauntless crew was cleared to land. While turning toward final, the aircrew noted two T-37s on final at about 1,500 feet. The '130 crew stopped their descent and the '37s flew beneath them and landed. They did a right 360 and were again told to descend and cleared to land. Rolling out on final, the aircrew noted two T-37s on the runway awaiting takeoff. The '130 crew executed a go-around and were finally able to land on the next attempt. It makes you wonder who, if anyone, was in charge.

Habit Patterns

The mishap sortie for this Aero Club Piper Comanche was the return leg of a cross-country out and back. The first leg was uneventful. The pilot planned and filed the return leg with a stopover for fuel. He set himself up on a shorter than normal downwind leg and completed part of the "Before Landing Checklist" but delayed lowering the gear, waiting for airspeed to bleed off. The pilot flew a normal base and final but forgot one very important item. You got it—no gear. On landing, the propeller blades and belly of the aircraft contacted the runway (not surprising) causing damage to the prop, possible engine damage, and sheet metal damage to the belly. The aircraft came to a stop and the pilot and one passenger egressed without injury. Again, we see what happens when something out of the ordinary comes up causing us to break habit patterns.

Gremlins

The crew of a C-21A experienced an unexpected dilemma as they configured their biz-jet for landing recently. When they lowered the gear, they were faced with a bright green nose wheel "steer on" light. They went around and entered holding to analyze the problem. While holding, they recycled the gear three times—all with the same result. They tried pulling and resetting the AC and DC nose steer circuit breakers one at a time. The crew found that by pulling the DC nose steer circuit breaker, they could get the light to go out. They declared an emergency and landed uneventfully. After slowing to taxi speed, they reset the circuit breaker but the light did not illuminate. The pilot pressed the control wheel master switch to engage the nose wheel steering and taxied, as advertised, to the ramp. Maintenance jacked the aircraft and recycled the gear numerous times without being able to duplicate the problem. They suspected the vibration from landing was enough to shake a stuck squat switch loose. The aircraft has flown numerous missions since the mishap without a similar incident. Magic fix.



After Deadlines

FLYING-HOUR MILESTONE—Chief Master Sergeant David H. Frazier of the 167th Tactical Airlift Group, West Virginia Air National Guard, recently met the criteria for the 25,000 Hour Individual Flying Hour Award. This unique accomplishment is a milestone of unsurpassed dimension. In November 1989, he was awarded the Dutch Huyser Award, the first Air National Guard flight engineer selected for this prestigious honor. We at *TMF* salute CMSgt. Frazier, and offer our congratulations.

A BOO-BOO OF CLASSIC DIMENSIONS— Many of our readers called us in a somewhat confused state of mind after reading an article in the Sept. 1991 *TMF*. Page eight features an article by MSgt. Gary Benton entitled, "Sometimes It Can't Be Helped" in which the author discussed the potential for ground mishaps during exercises. The next-to-last paragraph contains the statement, "Prepositioning chocks will cause a mishap—it's only a matter of time". Unfortunately, the three-letter word "not" was omitted. The line should read, "Not prepositioning chocks will cause a mishap—it's only a matter of time". Our apologies for any confusion this may have caused.

NEW COMPUTER EQUIPMENT—The time has finally arrived for *TMF* to upgrade our publishing procedures and equipment. For many years, we have been forced to type articles into antiquated Xerox 860 word processors, proof-read the articles, and transmit them via land line to the local Field Printing Plant where they are electronically reproduced and formatted into camera-ready copy. This procedure was time-consuming and labor-intensive. With the advent of the *real* computer age, we have acquired Unisys PC-3 personal work stations which enable us to type in articles, format them to the exact specifications of the magazine, and print them on a laser printer. The printer produces high enough resolution to give us "camera-ready" copy and eliminates the Field Printing Plant step in the process. Unfortunately, the learning curve is a monster to behold. Rest assured, we will keep you, our readers appraised of our progress.

SPEAKING OF CHANGES . . . Don't miss the November 1991 issue of *The MAC Flyer.* It will be the last one. Details will follow in that issue.

★ U.S. GOVERNMENT PRINTING OFFICE: 1991-554-015/40011

AIRLAUGHTER

By: BENTON '91

"BETTER LAY OFF THE CHICKEN INFLIGHT LUNCHES FOR A WHILE, MAJOR."